

granted a franchise over Eighth avenue, two miles to the Chesapeake & Ohio Railroad shops. The company will at once extend its lines over the street named.

**London, Ont.**—The London Street Railway Co. will extend its line to Pottersburg at a cost of \$10,000.

**Lyons, N. Y.**—The Lyons & Sodus Bay Electric Railroad has applied to the Board of Trustees at Wayne for consent to build an electric road through some of the principal streets of Wayne. The incorporators include G. W. Knowles, William S. Gavitt and Daniel Moran.

**McDonald, Pa.**—The Carnegie, McDonald & Canonsburg Electric Street Railroad will connect Carnegie with Walker's Mills, Gregg, Oakdale and McDonald, making in all a line 16 miles in length. The right of way and subscriptions to the capital stock are now being secured.

**McKeesport, Pa.**—The McKeesport, Monongahela & Finleyville Street Railway Co. was chartered at Harrisburg on May 20 with a capital stock of \$10,000. The line is to run along the river road near Dravosburg, through Mifflin and Jefferson townships to Monongahela borough, with a branch to Finleyville. President, J. L. D. Speer; directors, J. L. Moore, M. N. Bunting and others.

**Neptune City, N. J.**—The Atlantic Coast Electric Railway Co. has made application to the Borough Council for a franchise to build a road through Main street in Neptune City, the new line to parallel the track of the Ocean Grove & Belmar electric road. The matter will be considered June 2, when favorable action will probably be taken.

**Pittsburgh.**—The West End, Mt. Washington & Bankville Street Railway Co. of Pittsburgh, was chartered May 20 with a capital of \$12,000. The line will begin at a point on Woodbine avenue and run to Virginia avenue and Kearsage street. President, John C. Reilly; directors, T. S. Bigelow, W. J. Burns, E. S. Reilly and others.

**Portsmouth, Va.**—The White-Crosby Co., Baltimore, Md., have received the contract for laying the tracks and for the overhead work of three miles of street railroad for the Portsmouth & Port Norfolk Electric Railway Co. at Portsmouth, Va. Girder rails, 90-lb., will be used in one mile of the track, and T rails in the other two miles.

**Salem, Mass.**—The Lynn & Boston Railroad Co. will rebuild the old horse car line from Hamilton to Asbury Grove, a distance of one mile.

**Saratoga, N. Y.**—The Saratoga Traction Co. was incorporated May 20 to build a street surface road 2½ miles long from Broadway and Congress street to the Vichy Spring. Directors, R. B. Smith, Hackensack, N. J.; Charles G. Farwell, Boston; Charles H. Davis, New York; T. F. Hamilton, Saratoga, and others.

The Saratoga Lake Railroad Co. was incorporated May 20 with a capital of \$150,000 to build an electric road from Broadway and West Congress street in Saratoga to Moon's Corners on the west side of Saratoga Lake. Directors, R. B. Smith, Hackensack, N. J.; A. B. Thatcher, W. J. Worcester and others of New York, and Edwin Woodling, Cranford, N. J.

**Schuylkill Haven, Pa.**—The extension of the electric road to Schuylkill Haven, via the Pottsville & Reading Railway Co., is being pushed. Only the piers, abutments and bridges will be constructed by contract, the company doing the other work.

**Scranton, Pa.**—An ordinance has been introduced in Council granting franchises to the Scranton Traction Company to extend their tracks on the West Side.

#### GENERAL RAILROAD NEWS.

**Atlantic & Pacific.**—The transfer of the Western Division, which extends from Atlantic and Pacific Junction, N. Mex., to The Needles, Cal., 565 miles, to the Atchison, Topeka & Santa Fe, is expected to be made June 30. The sale was made on May 3, and has been confirmed by all the courts. A new company will be formed, to which the property will be turned over by Aldace F. Walker, R. S. Hayes and Victor Morawetz. Purchasing Committee for the Atchison, Topeka & Santa Fe.

**Baltimore & Ohio.**—The earnings for March and for the nine months ended March 31 have been reported as follows:

March:	1897.	1896.	Inc. or Dec.
Gross earn.....	\$2,121,912	\$1,916,368	I. \$205,544
Oper. expen.....	1,614,752	1,327,289	I. 317,463
Net earn.....	\$477,160	\$588,979	D. \$111,819
Nine months:			
Gross earn.....	\$10,363,473	\$18,005,221	I. \$1,358,252
Oper. expen.....	14,922,493	12,658,758	I. 2,263,735
Net earn.....	\$4,440,980	\$5,346,463	D. \$905,483

**Boston, Revere Beach & Lynn.**—On May 18 the Board of Railroad Commissioners of Massachusetts approved an issue of \$501,000, 30 year 4 per cent. bonds dated July 15, 1897, \$350,000 of which will be used to refund the present first mortgage 6 per cent. 20 year bonds of the company, which mature on the same date, the balance to be used in funding the floating debt. The company originally petitioned for an issue of \$1,000,000 bonds.

**Boston Terminal Co.**—The Board of Railroad Commissioners gave authority to this company on May 17 to issue \$6,000,000 fifty year currency 3½ per cent. bonds, dated Feb. 1, 1897, for the purpose of refunding \$6,000,000 3½ per cent. outstanding bonds which will become due Aug. 1, 1898. The new bonds will not be guaranteed by the Boston Terminal Co. against taxes.

**Chicago & Northern Pacific.**—The first mortgage bondholders met in New York City May 20, and ratified the plan of reorganization, which provides for the organization of a new company to be known as the Chicago Terminal & Transfer Railroad Co., to acquire the property of this company and of the Chicago & Calumet Terminal, a belt line operated in connection with this company. A synopsis of the plan was given in our issue of May 14.

**Harriman & Northern.**—Chancellor Lindsay, at Knoxville, Tenn., has appointed George W. Chandler Temporary Receiver of this road on petition of S. W. Murray and the Pittsburgh Locomotive Works. The road was sold under foreclosure July 23, 1895, to E. A. Quintard, of New York City, as Trustee. The actual purchasers, 25 in number, subscribed \$6,000 each to make the payment, taking bonds in exchange on which two payments of interest are now in default. The road is 22 miles long running from Harriman Junction to

Petres, Tenn., with a branch from James Ferry to Iron Mines, Tenn., 7 miles.

**Lake Shore & Michigan Southern.**—The earnings for the three months ended March 31 have been reported as follows:

	1897.	1896.	Inc. or Dec.
Gross earn.....	\$1,712,177	\$5,046,370	D. \$3,334,193
Oper. expen.....	2,930,910	3,182,514	D. 251,604
Net earn.....	\$1,811,267	\$1,864,356	D. \$53,089
Other income.....	83,019	98,713	D. 15,703
Total income.....	\$1,894,277	\$1,963,069	D. \$68,792
Charges.....	1,118,010	1,103,713	I. 14,297
Surplus.....	\$776,267	\$859,356	D. \$83,039
Cash on hand, \$1,012,493.			Profit and loss surplus, \$11,665,275.

At a special meeting of the stockholders, held at Cleveland, O., May 20, authority was given for the proposed issue of \$50,000,000 3½ per cent. gold bonds, payable June 1, 1897, for refunding purposes. All the property, franchises and income of the company will be mortgaged.

**Lehigh Coal & Navigation Co.**—Arrangements have been made with Brown Bros. & Co., of Philadelphia, to extend \$1,842,500 of the gold bonds due Dec. 15, 1897 (known as the "Gold Loan"), for a term of 17 years from June 15, 1897. New 4 per cent. bonds will be issued to mature June 15, 1914, interest payable semi-annually. The Fidelity Insurance, Trust & Safe Deposit Co. is the mortgage trustee. The balance of the loan (\$2,810,000) will be retired at maturity.

**Long Island.**—The New York Legislature has passed (and the Governor has approved) the bill providing for the depression of the tracks of this company in Atlantic avenue, Brooklyn, but it contains a proviso that work shall not be begun until the Special Commission of seven members, which is to do the work on behalf of the city of Brooklyn, and of the railroad company, shall be satisfied that a double track railroad will be built under the East River to Maiden Lane, New York City. This proviso will, in all probability impose an indefinite delay. The share of the cost of the Atlantic avenue improvement to be borne by the city of Brooklyn is one-half, though not exceeding \$1,250,000.

**Philadelphia & Reading.**—The earnings for April and for the five months ended April 30 were as follows:

April:	1897.	1896.	Inc. or Dec.
Gross earn.....	\$1,554,313	\$1,635,261	D. \$80,948
Oper. expen.....	918,359	939,742	D. 21,383
Net earn.....	\$635,954	\$695,519	D. \$59,565
Ten months:			
Gross earn.....	\$7,845,041	\$8,226,656	D. \$380,615
Oper. expen.....	4,522,038	4,891,194	D. 369,156
Net earn.....	\$3,323,003	\$3,335,462	D. \$11,459

**Pittsburgh, Cincinnati, Chicago & St. Louis.**—The earnings for April and for the four months ending April 30 have been reported as follows:

April:	1897.	1896.	Inc. or Dec.
Gross earn.....	\$1,037,655	\$1,217,277	D. \$179,622
Oper. expen.....	892,137	851,172	D. 40,965
Net earn.....	\$255,518	\$366,105	D. \$110,587
Charges.....	273,385	271,173	I. 2,212
Deficit.....	\$18,350 (surp.)	\$4,932	\$13,282
Four months:			
Gross earn.....	\$4,380,195	\$4,841,332	D. \$461,137
Oper. expen.....	3,422,419	3,832,917	D. 410,498
Net earn.....	\$957,776	\$1,008,415	D. \$50,639
Charges.....	1,088,147	1,096,452	D. 8,305
Deficit.....	\$130,371	\$88,737	I. \$41,634

**St. Louis & San Francisco.**—Judges Sanborn and Thayer, of the U. S. Circuit Court of Appeals at St. Louis, handed down an opinion on May 24 in regard to the leases of branch lines of this company. It was petitioned that the rental contracts be annulled because the branches did not yield enough to pay current expenses. The amount in question was \$193,000, rent not having been paid since April 4, 1894. In the opinion of the Court the Receivers were liable for the rental, and were under obligations to carry out the contracts made by the company. The branch lines in question are the St. Louis, Salem & Arkansas, the Kansas City & Southwestern, the St. Louis, Kansas & Southwestern and the Kansas Midland.

**Southern.**—The earnings for April and for the ten months ended April 30 were as follows:

April:	1897.	1896.	Inc. or Dec.
Gross earn.....	\$1,489,813	\$1,403,199	I. \$86,614
Oper. expen.....	1,199,968	1,084,190	I. 115,778
Net earn.....	\$389,845	\$319,009	I. \$70,836
P. c. expen. to earn.....	73.8	77.2	
Ten months:			
Gross earn.....	\$16,172,047	\$16,518,966	D. \$346,919
Oper. expen.....	10,944,673	11,328,172	D. 383,499
Net earn.....	\$5,227,374	\$5,190,794	I. \$36,580
P. c. expen. to earn.....	67.6	68.5	

**Wabash.**—The earnings for April and for the ten months ending April 30 have been reported as follows:

April:	1897.	1896.	Inc. or Dec.
Gross earn.....	\$878,253	\$979,106	D. \$100,853
Oper. expen.....	617,207	765,220	D. 148,013
Net earn.....	\$261,046	\$213,886	I. \$47,160
Ten months:			
Gross earn.....	\$9,616,667	\$10,062,439	D. \$1,015,772
Oper. expen.....	6,691,148	7,509,430	D. 818,282
Net earn.....	\$2,925,519	\$3,153,009	D. \$197,490

#### Electric Railroad News.

**Bangor, Me.**—The Bangor, Hampton & Winterport Railway Co. has not been offered for sale as reported. The money has been secured to build the road and a portion of it has been constructed, and it is expected to have the road in operation to Winterport within the next 10 weeks.

**Pittsburgh.**—The Pittsburgh, Allegheny & Manchester Traction Co. has decided to make a new 5 per cent. mortgage of \$350,000, but at present only \$150,000 of the bonds will be used, and these will take the place of the present mortgage covering the floating debt of \$163,000, which is now bearing interest at 6 per cent. The net earnings of the company for the year ending April 30 were \$155,000, against \$126,000 in 1896.

**Saginaw, Mich.**—Homer Loring, of Newton, Mass., has been appointed Receiver of the Union Street Rail-

way Co. and of the Consolidated Street Railway Co., of Saginaw, Mich.

**Westfield, Mass.**—The Woronoco Street Railway Co. has been authorized by the State Railroad Commission to increase its capital stock from \$50,000 to \$100,000 and its bonded debt from \$35,000 to \$70,000. The officers of the company state that extensions will probably be built at once in Union, Main, Noble and West Silver streets. They state, however, that the extension eastward toward Springfield will probably not be built this year.

#### TRAFFIC.

##### Traffic Notes.

W. S. Gibbon & Son, of St. Louis, are building a boat that will draw 4 ft. 6 in. of water, which they say they intend to run through between St. Louis and Vera Cruz, Mex.

The North Pacific Coast Railroad sells season tickets between San Rafael and San Francisco at a lower price for women than for men, the rate being \$8 for the former and \$5 for the latter. A man who feels aggrieved at this discrimination has complained to the Railroad Commissioners.

The Railroad Commissioners of Georgia have summarily dismissed a petition for reductions in rates on general merchandise and on fertilizers, a brief statement being made to the effect that the Commissioners believe the railroads are not now in a position to make a general reduction in rates.

Reports that the Hocking Valley, the Ohio Central, and the Cleveland, Sandusky & Hocking lines have stocked up the Cincinnati scalpers with interchangeable mileage tickets have disturbed the other Central Passenger Association lines, and they threaten a boycott. Whether they will have the courage to do it remains to be seen, but they have served notice.

The Lake Shore & Michigan Southern has reduced passenger rates between Cleveland and Painesville and Cleveland and Elyria to about 1½ cents a mile, to compete with the electric roads. This low rate can be had only by buying 25 rides at once, however. A Cleveland paper says that the rate is a trifle lower than by the electric line; and the speed is, of course, considerably better.

A New York paper says that suburban passengers coming daily to that city bring their bicycles with them because they can get free storage for the wheels in the baggage-rooms in the city, whereas they cannot at the suburban stations where they board the trains. The facts, according to this claim, are that the passenger uses the bicycle from his house to the railroad station, and there would like to get it stored free during the day, so as to have it available for the return trip at night, but that the railroads, in their narrow-minded stinginess, neglect to grant this inexpensive favor, and therefore bring upon themselves the larger burden of carrying the wheels to and from the city every day.

With the beginning of the new time table, next Sunday, the New York Central will restore the 10 a. m. limited train from New York to Chicago, running it through in 24 hours, over the Michigan Central. This train, taken off several years ago, formerly ran through in 25 hours and went over the Lake Shore & Michigan Southern. Since its discontinuance sleeping-cars have been run from New York on the fast mail train, starting at 9:30 a. m. Eastbound, the new train will leave Chicago at 1 p. m. and reach New York the next day at 2 o'clock, making the speed the same in both directions. The North Shore Limited, westbound, now leaving New York at 4:30 p. m., will start at 5 o'clock and will be run over the Lake Shore & Michigan Southern instead of the Michigan Central. The time of this train will also be shortened one hour, so that it will reach Chicago at 4 p. m. The eastbound train over the Lake Shore will run the same as now, leaving Chicago at 5:30 p. m. and arriving in New York at 6:30 the following evening.

#### Chicago Traffic Matters.

CHICAGO, May 26, 1897.  
Lines in the Central Passenger Association are considering the idea of establishing a mileage bureau, similar to that created some time ago by the Western roads. Commissioner Donald has drafted rules for such a bureau, providing that all existing forms of interchangeable mileage tickets, excepting 5,000 mile, be withdrawn from sale, and that beginning with June 1, under the direction of the Commissioner of the Central Passenger Association an interchangeable 1,000-mile ticket to be issued, to supersede all existing forms of 1,000 individual or joint mileage tickets, including advertising tickets, and to be sold at \$30 and limited to one year from date of sale. Each line is to report weekly sales. Mileage strips to be turned in to Commissioner and he to refund \$10. Final action is to be taken on the matter June 3.

The regular three-cornered fight between the Lake Michigan Car Ferry Company, the Lake Superior & Lake Michigan Transit Company, and the Chicago-St. Paul all-rail lines has begun, and will doubtless rage with more or less fury until the close of navigation. The Lake Superior company announces the following rates to meet the tariff of the car ferry:

Class.....	1	2	3	4	5	6
Rate.....	\$ .30	\$ .24	\$ .15	\$ .13	\$ .12	\$ .10

This tariff applies from Chicago to St. Paul and is 50 per cent. less than the rates in effect when the season first opened.

Eastbound shipments from Chicago and Chicago Junctions to points at and beyond the Western termini of the trunk lines for the week ending May 20 amounted to 49,104 tons, as compared with 48,420 tons the preceding week. This statement includes 14,436 tons of grain, 3,740 tons of flour and 9,666 tons of provisions, but not live stock. The following is the statement in detail for the two weeks:

Roads.	WEEK ENDING MAY 20.		WEEK ENDING MAY 13.	
	Tons.	p. c.	Tons.	p. c.
Baltimore & Ohio.....	4,659	9.5	3,427	7.1
C. & C. & St. Louis.....	5,133	10.5	2,987	6.2
Erie.....	3,221	6.6	5,384	11.1
Grand Trunk.....	3,167	6.4	3,674	7.6
I. S. & M. S.....	5,387	11.9	6,171	12.7
Michigan Central.....	9,059	18.4	8,478	17.5
N. Y., Chi. & St. L.....	3,741	7.6	4,733	9.8
Pitts., Cin. & St. Louis.....	3,667	7.5	3,821	7.9
Pitts., Ft. Wayne & Chicago.....	7,108	14.5	6,374	13.2
Wabash.....	3,482	7.1	3,371	6.9
Totals.....	49,104	100.0	48,420	100.0

Lake shipments last week were 87,893 tons.





FRIDAY, JUNE 4, 1897.

CONTENTS

ILLUSTRATIONS:	PAGE.	EDITORIALS:	PAGE.
Hartford Meeting of the American Society of Mechanical Engineers	383	The Richmond Meeting	399
The Adjusted Car-Mile as a Basis for Engine Performance	384	Cubic-Foot Rates for Bulky Freight	399
Standard Steel Truck—Mexican Central Railroad	385	EDITORIAL NOTES	398, 400
The Cloud Metal Trucks	386	Trade Catalogues	400
Combination Passenger and Baggage Cars—Baltimore & Ohio	388	GENERAL NEWS:	
The New Vestibule Train of the Chicago, Burlington & Quincy	390	Locomotive Building	403
The Goodwin Steel Dump Car	391	Car Building	403
New Roller Side Bearing	392	Bridge Building	403
A Fire-Hose Bridge	392	Railroad Law	403
The Howe Air-Brake for Electric Cars	393	Meetings and Announcements	404
The Erie Coupler	394	Personal	404
Tool for Grinding Locomotive Links	394	Elections and Appointments	404
The "Bury" Locomotive	395	Railroad Construction	405
The Slide Rule as an Aid to Railroad Field Work	395	Electric Railroad Construction	405
Smoke Prevention in Austria	397	General Railroad News	406
CONTRIBUTIONS:		Electric Railroad News	406
The Old Eye-Bars of the Rock Island Bridge	383	Traffic	406
English Railroad Employees	383	MISCELLANEOUS:	
EDITORIALS:		Technical	401
The Present Standing of the Steel Truck	398	The Scrap Heap	402
Judge Brewer's Decision	399	The Chicago - Nashville Fast Run	387
		The Supreme Court on the Powers of the Interstate Commerce Commission	389
		Railroads of the World at the End of 1895	391
		Changes in the Standard Code	392
		How to Manage a Freight Station	394
		Foreign Railroad Notes	397
		Municipal Ownership of Street Railroads in England	400

Contributions.

The Old Eye-Bars of the Rock Island Bridge.

The Phoenix Bridge Company, PHOENIXVILLE, PA., May 26, 1897.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Referring to your paper of May 14, containing an article upon the "Condition of the Material of an Old Bridge," I beg to state that the explanation of Mr. Theodore Cooper in connection with a crystalline fracture of the heads of the old iron eye-bars, as shown when these bars were cut up, is no doubt the proper explanation. These old iron bars were not strained nearly to their elastic limit under the maximum load which it was possible to put upon the old Rock Island bridge, and I believe it is a well accepted fact that the structure of metal cannot be changed by the application of loads below the elastic limit.

JNO. STERLING DEANS.

English Railroad Employees.

LONDON, May 12, 1897.

TO THE EDITOR OF THE RAILROAD GAZETTE:

In my last letter I mentioned the question of fines, and I am glad now to be able to add that the South Eastern has abolished the system of fines altogether in all departments. The North Western has done the same thing with its locomotive staff, and I believe other companies also.

I mentioned likewise the question of pension funds. One of these, that of the Lancashire & Yorkshire Company, has now been before Parliament. The Amalgamated Society of Railway Servants did its best to oppose, but was refused a hearing before the Committee to which the bill was referred. The Committee considered the matter very carefully, and determined to approve of the scheme, provided that employees were absolutely free to join or not as they thought fit, and that the solvency of the fund was secured beyond question by a Board of Trade audit.

Although defeated on this point, there can be no question that the strength of the Amalgamated Society has been greatly increased by the events of the last few months. Something like 18,000 new members have joined since the beginning of the current year, and several companies are being hard pressed by the society at the pre-ent moment. There is, however, little fear of a further outbreak of actual hostilities.

One effect of the agitation for shorter hours of work has just been shown in a notice, signed by all the great companies having termini in London to the effect that henceforward they will collect no goods from their customers after 6 p. m. on the first five days of the business week and 3 p. m. on Saturdays.

The course of events on the North Eastern since the strike has been full of interest. On March 12, the directors met a body of delegates from their staff and replied to their demands with a long and carefully drawn minute. This minute stated that the men's demands would imply an additional expenditure of no less than £380,000 per annum, and that this was quite out of the question; that the wages paid by the company were fully equal to, if not above, the average wages current in the district for similar work; that on the present terms there were always many more applications for employment than there were places available; and the directors therefore were not prepared to make any further concessions, but they would agree to refer the matter to arbitration, subject to the proviso that arbitration should be

limited to questions of wages and hours. "The directors are not prepared to refer arbitration any question affecting the discipline and control of the staff." Further, the proposal that eight hours should constitute a day's work for the locomotive staff was, said the minute, entirely inadmissible. The directors had the less hesitation in standing firm on this latter point, as it was clearly manifest that the Amalgamated Society only represented a small minority of the drivers and firemen, the bulk of whom are members of a separate and by no means over friendly organization, the Associated Engine-drivers and Firemen.

After some hesitation the men agreed to accept their directors' terms, and within the last few days it has been announced that Lord James of Hereford, who is not only a great lawyer, with long experience in arbitrations, but also a Cabinet Minister, has consented to act as arbiter. Considering the stir which was made by the North Eastern strike and the general paralysis which it caused in the business of the district, it is somewhat remarkable to find that the number of men who actually struck work was only about 5,000 out of a total company's staff of between 40,000 and 50,000.

W. M. ACWORTH.

Hartford Meeting of the American Society of Mechanical Engineers.

Good papers, ample discussion, carefully arranged entertainments and a large attendance made the Hartford meeting a very successful one in every particular. The meeting opened Tuesday evening with an address of welcome by Mayor Miles B. Preston, of Hartford, which was responded to by President Worcester R. Wanner, of the society. The professional papers were presented Wednesday, Thursday and Friday mornings and Friday evening, and in the afternoon of each day excursions were made to works in and about Hartford. The members were much interested in the visit to the Pope Motor Carriage Works, and expressed themselves favorably at the ease of control of the electric carriages which the company have very recently placed on the market. The trip over the Hartford-New Britain third rail electric road also afforded particular interest, as it gave the members an opportunity to study closely the machinery and the details of the construction of the road.

At the regular business session, Wednesday morning, Mr. Gus C. Henning made a report calling attention to the necessity of securing standard specifications for the quality of metals used in different departments of mechanical engineering. The matter was ordered printed for the use of the members, and will eventually go before the Council for action to be reported at the annual meeting in New York next December.

The first paper taken up was on "The Diagrams for Relative Strength of Gear Teeth," by F. R. Jones, of the University of Wisconsin, Madison, Wis. The accompanying diagram, Fig. 1, shows the results of plotting the values of  $P$  in the standard formula,

$$P = \frac{t b h^2}{6 l},$$

where the stress in the outermost fiber is taken at 6,000 lbs. per square inch. From the results a number of diagrams were constructed with a view to facilitating the ease of computing the sizes and pitches of gears which are capable of withstanding a known or assumed pressure transmitted to them by an intermeshing gear. Mr. G. C. Henning pointed out that the same formula could not be applied for both cut and cast gears, and Mr. John Fritz thought that gears should be avoided as far as possible, and should not be used where sudden shocks were likely to occur.

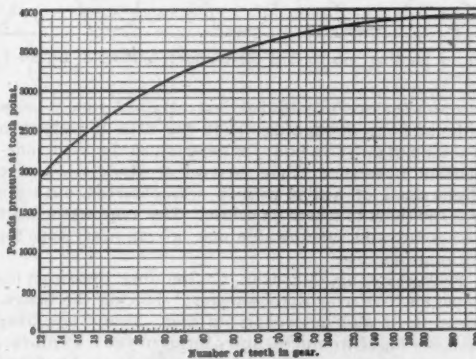


Fig. 1.—Diagram of Strength of Gear Teeth.

The paper on "Experiments in Boiler Bracing," by F. J. Cole, was published at length in our issue of last week, page 369.

Prof. De Volson Wood discussed briefly two cases of "Adiabatics," and while the principles upon which the solutions were founded are well known, the particular applications were new so far as known to the author. Mr. George Richmond followed by indicating a method for solving thermo-dynamic problems without the use of the calculus, and he has been asked to prepare a paper bearing on the subject for the next meeting. The impression was left in the minds of some of the members that Mr. Richmond has worked out an entirely new process for the solution of problems that involve adiabatics; but, if we understood Mr. Richmond's method, it was simply a discussion of the well-known "entropy-temperature" analysis.

The paper on a "New Form of Transmission Dynamometer," by F. A. Bedell, will be found in full in last week's issue. "Flue Gas Analysis and Boiler Tests," by Mr. R. S. Hale, of Boston, gave the results of experiments and tests along this line, and called attention to the necessity for careful analysis. In the discussion, Mr. William Kent pointed out the difference of opinion between chemists and engineers as to the presence of carbonic oxide in flue gas. He also spoke of the importance of determining the best method of collecting the gas, which is still an open question among engineers, affording a great deal of ground for study.

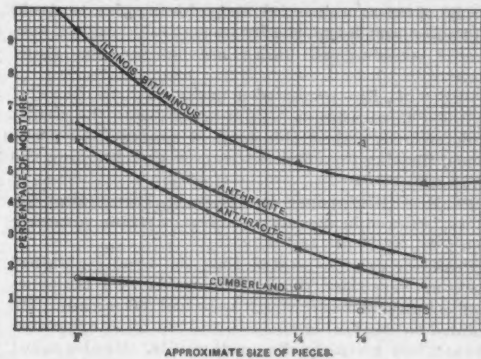


Fig. 2.—Hygrometric Properties of Coal.

The closing paper of the day was by Prof. R. C. Carpenter on "Hygrometric Properties of Coals." We republish the diagram, Fig. 2, showing the results of his experiments. The paper was criticised briefly by Messrs. Oberlin Smith and G. C. Henning because of the indeterminate quantities used in the reported investigations.

Considerable interest was taken in the papers on "Electricity versus Shafting in the Machine Shop," by Prof. Charles H. Benjamin, and "Electrical Power Equipment for General Factory Purposes," by Prof. D. C. Jackson. Professor Benjamin's paper dealt in part with the following assertions which he regarded as established facts: (1) That the first cost of electrical machinery is usually greater than that of shafting and belting; (2) that the saving in power in most machinery establishments will pay for the additional cost of the electric plant in from one to five years; (3) the question of the advantage of introducing electricity hinges not upon the efficiency of transmission, but upon the effect on the output of product per man and per machine. He proceeded to point out the advantages in regard to clear head room, light and cleanliness, control of speed and the general flexibility of this method of transmission. In concluding, he raised the question whether the polyphase or the continuous current is best adapted for this class of work, and pointed out the disadvantage of the former in regard to the regulation of speed. The paper by Professor Jackson was for the most part a reprint of his paper presented at the December meeting of the Western Society of Engineers, a careful abstract of which appeared in the *Railroad Gazette* April 2, 1897, page 234. He has added, however, a typical list of concerns that operate 100 to 500 H. P. of electric motors, and also gives the following list of ten concerns owning plants with over 500 H. P. capacity in electric motors now in operation: Ohio Steel Co., Johnson Co., Carnegie Steel Co., Apollo Iron & Steel Co., Cambria Iron Co., A. & P. Roberts Co., Baldwin Locomotive Works, Westinghouse Machine Co., Whitman & Barnes and Silver Springs Bleaching & Dyeing Co.

The discussion following these papers was for the most part favorable to electric transmission and some cases were given where the substitution from long line shafting has been made with a noticeable increase in economy. The subject will be considered further at the December meeting of the society.

The subject of "Volumetric Contraction of Cast-Iron," by Mr. Francis Schumann, was simply an addendum to the matter presented by him at the last meeting.

Prof. W. T. Aldrich read a paper on "Rating Electrical Power Plants upon the Heat Unit Standard." The basis of his argument was that in an electrical power plant the work done should be given as the steam delivered to the engine, as is done in all pumping engines, instead of giving the rating in pounds of coal per horsepower. Professor Aldrich in presenting his paper added some data, to show what differences are found between estimated and actual duties. With the efficiency of dynamo = 95 per cent., efficiency of engine = 92 per cent., and efficiency of the two combined = 87.5 per cent., it was found that the actual duties obtained in practice are but two-thirds of the estimated duties for simple, compound and triple expansion engines when they are belt or direct driven.

Mr. Chas. T. Porter, Hon. Member, and Prof. L. S. Randolph sent in written discussions. The former concurred in the suggestions and agreed to the main proposition that the steam generator should not be considered as included in the unit since it is entirely separate and frequently used for other purposes such as heating, and is quite variable, due to the manner of firing and fuel used as well as subject to other conditions. Therefore, while the rating would always be the same under like conditions when based on heat units

\* The present installation of electric motors in the Baldwin Locomotive Works was considered at some length in the *Railroad Gazette*, April 2, 1897.



put into the engine, it would change from day to day if based on pounds coal burnt under boiler.

Mr. Wm. Kent, differed from the author in thinking that the whole plant, including boilers, should be the unit, and not the engine dynamo part of it; for if cost of operating the installation is to be guaranteed, it should be based on consumption of coal as well. He also pointed out that the mechanical equivalent of heat now generally used is 778 instead of 772.

Professor Aldrich, in answering, stated that in all pumping stations the guarantee was based upon the machinery regardless of source of steam; that the belt and geared dynamos were antiquated as much as similar arrangements in pumping plants; that this was only a relic of the experimental stage, for in order to avoid all unnecessary losses, the dynamos should be direct-connected, avoiding all useless mechanism and many losses.

Prof. A. L. Rice presented a paper on "the Laws of Cylinder Condensation." In it he compares the results of noteworthy and reliable tests of engines of various kinds, plotting the efficiency curves and bringing the subject up to date.

Mr. H. A. Hill's paper on "Tests of Three Sulzer Engines," showed in one series of tests a steam consumption per I. H. P. of 11.3 lbs.

Professor Jacobus stated that the results obtained were not very astonishing when considering the types and conditions under which tests had been made. He pointed out that other engines, and not triple expansion at that, had given equally good results. He also called attention to the fact that these tests were "builders' shop tests," which frequently gave very high results, not obtainable in actual practice, and cautioned engineers to make due allowance for this fact.

Mr. H. M. Lane's paper on "Method of Shop Accounting to Determine Shop Cost and Minimum Selling Price," brought out in the discussion only a few details of the several factors of cost, and these were for the most part fully discussed in a previous paper presented at the December meeting.

The illustrated lecture by Dr. Leonard Waldo, on "History and Development of the Bicycle," brought out on the screen some unusually fine and sharp photos; even such delicate subjects as the structure of a fractured case-hardened piece of steel was shown so clearly that the crystals were visible from every part of the hall.

Prof. J. H. Barr presented a paper on "Current Practice in Engine Proportions," in which he gives valuable data as to dimensions of parts of various classes of steam engines as at present built. He points out the existing variations and gives formulas for calculating dimensions and also empirical factors to be used therein.

Prof. W. S. Aldrich discussed the flywheel proportions, pointing out that the weight thereof is generally con-

punctured a hole and this could be blue printed; he further advised making the mark at end of stroke.

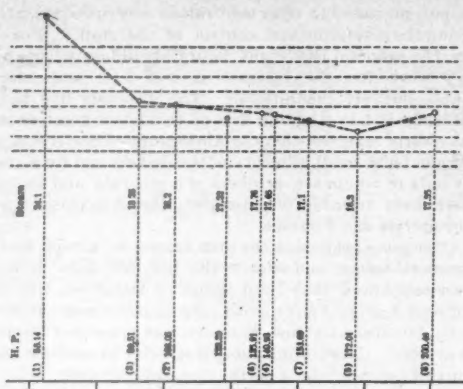


Fig. 4 - Diagram of Load and Steam Consumption for a 160-H. P. Compound Engine.

Mr. A. K. Mansfield's paper on "The Best Load for Compound Steam Engines" was read by title only, as the author was absent. We give in Fig. 4 the results of a series of tests reported on a 160 (nominal) H. P. Buckeye engine.

On Friday afternoon the society boarded a schooner, which was towed down the Connecticut River about 18 miles to the famous Portland brownstone quarries. Thence the party went by rail to East Berlin to inspect the shops of the Berlin Iron Bridge Co., after which the power house of the New York, New Haven & Hartford Railroad was visited. One generator was in operation, while the other was in course of erection. That doing the work was rocking its whole foundation and was thought by some to be anything but a modern installation. The engines were, however, running smoothly and are excellent examples of the Greene engine, showing superior finish and workmanship. From New Britain the third-rail electric cars were taken to Hartford. Two incidents may be mentioned in this connection: the danger of the third rail, and the perfect operation of the entire plant.

One of the party, who always wants to know the whys and wherefores, tried to test the force of current in the third rail by placing his steel-frame silk covered umbrella with its tip on the third rail and its handle on the outer rail. No sooner had contact been established than there was a flash, a hiss, some smoke and a wiser and very much frightened engineer. But of the umbrella, only some ashes and scattered pieces remained. The railroad however, kept right on in its work. The other incident was the run of 9½ miles in 11 min. 3 secs. In about two

having circular ordinates, hence required redrawing the curve to right-angle co-ordinates; that it would only be used up to yield points, hence gave but a partial card or record of the test and also that there are indeterminate errors due to elastic changes of shape in instrument during test, which caused errors in records.

Professor Gray then presented a paper on "Effect of Alternate Positive and Negative Stresses in Iron and Steel" and also one on "The Yield Point in Iron and Steel." These were discussed by Mr. C. Henning, who had made similar experiments and had obtained similar results.

Prof. D. S. Jacobus presented a paper on "Apparatus for Accurately Measuring Pressures of 10,000 lbs. per Square Inch and Over," printed in full in our issue last week. This was followed by his paper on "Tests to Show the Influence of Moisture on the Economy of a Steam Turbine." He described the use of a friction-brake which was absorbing all the load of a steam turbine running at 2,500 revolutions per minute. After trying water on the inside and outside without success, he overcame all difficulty by merely putting some soap under the ropes, which were wrapped around the pulley to act as brakes. With this simple expedient there was no further trouble, and the engine and brake ran without trouble.

#### The Adjusted Car-Mile as a Basis for Engine Performance.

For almost a year the officers of the Pennsylvania Lines West of Pittsburgh have been conducting tests to determine the resistance of cars in freight trains and investigating the practicability of applying an adjustment to the car-mile measurement of engine performance which would form a fairer basis of comparison than the methods employed, both in the past and on most divisions of this road at the present time. As it is the practice of this road to pay engine men and firemen premiums on coal saved, over and above a certain amount, it is especially desirable, both for the railroad company and the men, that the best basis possible be determined.

The tests referred to were prompted by a desire to measure with reasonable accuracy the work done by the engines and engine crews in hauling different trains, just as they come in every-day practice, so that in looking over a statement of the coal consumed by different engine crews, it would be possible to know whether the increased consumption of one crew over that of another was warranted by increased work. It was not intended to apply the results of this investigation either to the performance of engines in passenger service or in local freight service, as for both of these classes of trains a strict mileage basis is all that is necessary.

It was originally the practice of the Pennsylvania

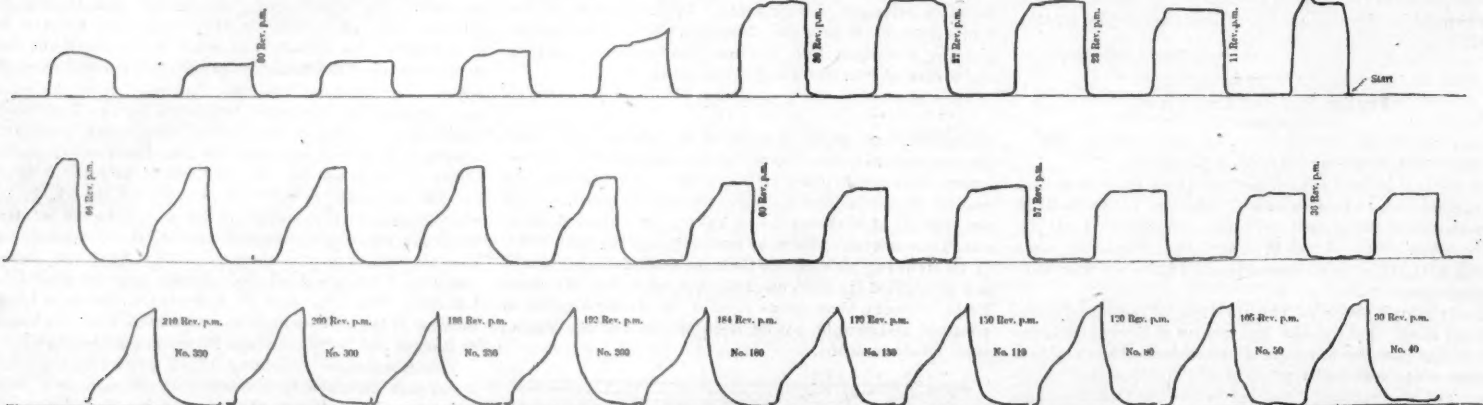


Fig. 3 - Continuous Indicator Cards, Taken from Starting, up to 210 Revolutions a Minute, on an Express Locomotive Drawing a Heavy Train.

sidered one of the shop secrets and treated generally as proprietary with the builders, who base it upon past experience. He also mentioned that the length of crank-pin is, after all, a matter of custom.

Prof. Thos. Gray presented a paper on a "Continuous Steam Engine Indicator," in which he described such instrument, its use and application, giving long series of cards of locomotive and other engines. We reproduce in Fig. 3 a series of cards taken by Mr. Gray from a locomotive which was drawing a heavy express train. In the discussion, Mr. A. A. Carey showed and explained the Amster Integrating Indicator, made by Schaffer & Budenberg, giving its theory and application.

Professor Jacobus mentioned that a similar continuous indicator had been in use for some time at the Stevens Institute and spoke of a planimeter for measuring the areas of peculiar curves obtained which are quite different from the ordinary indicator cards. He called attention to the difficulty of obtaining the starting and stopping points of the cards. He also stated that the Amster instrument could not be used in all cases, while the Gray and Stevens instruments were equally good for all purposes.

H. H. Tupples stated that Morin in 1840 was using a continuous indicator, while Sir Daniel Gooch used one a little later for locomotives, using elliptic springs for the steam pressure. Professor Barr mentioned that the starting and stopping points could be shown very clearly by passing a spark through silvered paper, which became oxidized by the slightest electric spark without resorting to the use of an electro-magnet; the spark

minutes the car fully loaded had attained a speed of 54 miles an hour, at one time about the fifth minute even reaching 62 miles an hour, as determined by two independent observers. Upon arrival at Hartford, a very slight smell of heated varnish was observed, but time was too short to locate its origin. The trip was a most successful and comfortable one, giving every hope for ultimate success.

Friday evening, Mr. Gus. C. Henning presented his paper on "A Mirror Extensometer," showing the instrument itself and describing its uses. Prof. Thos. Gray spoke in highly complimentary terms of the instrument, endorsing its accuracy and great usefulness for determining the minutest changes of shape and length.

In illustrating his paper on "A Pocket Recorder for Tests of Materials," Mr. Henning showed the instrument in working order, and pointed out its universality and facility of application to all sizes and shapes of customary test pieces and testing machines.

Prof. C. H. Benjamin in a letter called attention to an apparatus which multiplies extensions 50 times and for which he claimed great accuracy. Prof. Thos. Gray spoke of the great and general usefulness of the instrument and recommended its general adoption, but suggested that there might be difficulty, due to the fact that it would tell such truthful tales and show up all the peculiarities of materials and of the men operating the testing machine.

Mr. Henning, in answering the points raised, explained that Professor Benjamin's apparatus was radically defective for practical purposes, in that it wrote a diagram

Lines West of Pittsburgh to use the car-mile as a basis of measurement, in which two empty cars were taken equal to one loaded car. Somewhat later the ton-mile was used instead, which included in the tonnage the weight of the lading, the weight of the cars and the engine resistance reduced to its equivalent in tons. It was found that the ton-mile was hardly a fair basis for comparison, for the reason that 1,000 tons made up of loaded cars and 1,000 tons made up of empty cars resulted in a difference in the work performed by the engine, and hence in the coal consumed, in hauling these loads a given distance at a given rate of speed. It was, therefore, desired to determine the relative resistance of the ton and the car.

For this purpose the first tests were made on the Chicago Division, between Logansport and Fifty-ninth street yard, Chicago, a distance of 115 miles, in July, 1896, and a total of about 40 trains was run. The Chicago Division presented a number of advantages over many of the others, in that eastbound through freight trains are run practically on the same schedule, while the westbound schedule for the same class of trains is nearly constant. The eastbound through freight trains are run mostly at night, leaving Chicago in the evening and so have few trains, either passenger or freight, moving in the opposite direction, to meet. The westbound freight trains, on the other hand, are mostly run in the day time, and have many opposing trains to pass, so that the schedule for the westbound trains would be slower between terminals than the eastbound if the same speed was maintained while in motion.



The test trains were run on a constant eastbound and a constant westbound schedule, using the same standard consolidation class "S" engine and the same crew on all the trials. The total weight of the train was kept constant, while the number of cars varied. The coal was weighed at the wharf as it was placed on the tender, and what remained at the end of the trip was accounted for by means of strips on the sides of the tank. These strips

as had the necessary weight and number of cars to obtain averages. As explained before, the schedule of these trains was practically the same as the first test trains. The results of this investigation are shown by Figs. 2 and 3, which corroborate the results of the previous tests. Figs. 1 and 2 show that as the speed decreases, the resistance of the car decreases, and that as the speed is reduced to from 5 to 10 miles per hour, as occurs on

adjusted or unadjusted, would be a more accurate basis, and no doubt as more information is obtained on the subject, it will be found desirable to use either one or the other in preference to a ton-mile basis.

The adjusted car-mile basis has been put into effect on the Chicago and the Richmond divisions of the Pittsburgh, Cincinnati, Chicago & St. Louis, and the result of its working is being closely watched and additional data is each month being collected from the trains running in regular service.

Mr. S. P. Bush, Superintendent of Motive Power of the Pennsylvania Lines West of Pittsburgh, has furnished the information given here and the results of the tests.

#### Standard Steel Truck—Mexican Central Railroad.

Mr. A. A. Robinson, President of the Mexican Central, has designed a metal, diamond frame truck, for 60,000-lbs. capacity freight cars, which has been adopted as standard by that road. Two of these trucks were built in November, 1896, and ten since January of the present year, which are being used under locomotive tenders. These have given good service and similar trucks are now building for the tenders of the new Mexican Central engines which the Brooks Locomotive Works are furnishing, and also they will be used under 600, 60,000-lbs. capacity box cars which the Michigan-Peninsular Car Co. is building for the same road.

The accompanying engravings illustrate the peculiar features of the construction, but do not convey the impression of strength and rigidity which is gained by an inspection of the truck itself. On account of the open frame all the parts and connections are easily reached and permit of a ready examination.

The side frame as shown is of the diamond type in

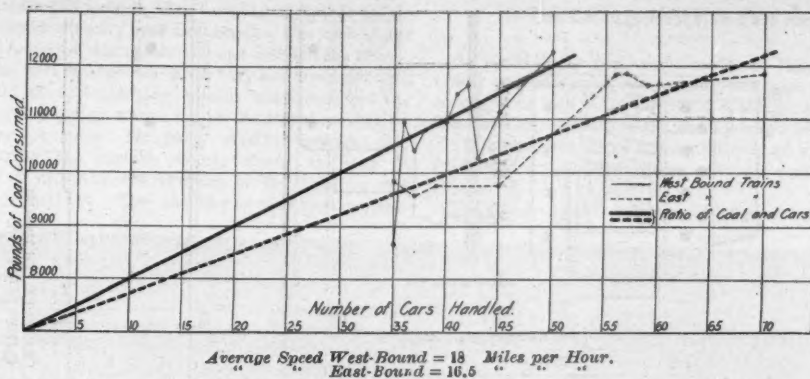


Fig. 1.—Results of First Train-Resistance Tests—Chicago Division, P., C., C. & St. L. Ry.

are provided with divisions which register every 100 lbs. In measuring the coal left in the tender it is necessary to shovel all that may be on top down into the pit of the tender, the coal being allowed to assume its natural slope forward; the number placed opposite the division crossed by the slope line of the coal gives the number of pounds of coal remaining in the tender.

The results of the first tests are given in Fig. 1, plotted to show, with a constant tonnage, the relation between the coal consumed and the number of cars handled. The average speed for the westbound trains was 18 miles per hour, while for the eastbound trains it was 16.5 miles an hour. After determining graphically the increase of coal consumed per car added, the amount of coal used, excluding the effect of the cars outside of the weight, is

heavy grades, the ton becomes the important factor in the total resistance. Fig. 3, which is plotted with the weights of trains as abscissas and the pounds of coal consumed as ordinates, shows the wide variation that takes place in individual cases, where various outside conditions enter to affect the result, but the average of all shows that for the same number of cars an increase in the tonnage increases the coal consumption but very little.

It is therefore apparent that under the conditions existing on this particular division a strictly car-mile

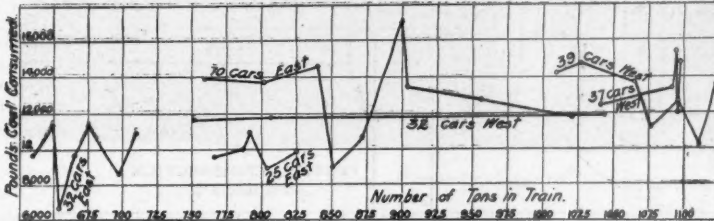


Fig. 3.—Service Trains—To Show the Variation in Coal Consumption for a Constant Number of Cars and a Variable Tonnage.

found, as shown by Fig. 1, by producing the line of increase to the line of zero cars, which for the east and westbound runs was 7,000 lbs. This assumes that the whole tonnage is at the drawbar of the tender. It was previously determined by experiment that to overcome the resistance of the engine alone required approximately 30 lbs. of coal per mile, which, for the entire distance, would be 3,450 lbs. The difference between 7,000 lbs. and 3,450 lbs., equal to 3,550 lbs. of coal, is what is required to haul 1,100 tons of weight, under these conditions, over the division, or 3.23 lbs. of coal is required per ton. The test on the westbound runs showed that the resistance of each car added was equivalent to 100 lbs. of coal consumed, and for the eastbound runs 74.4 lbs.; therefore 100 divided by 3.23, equal to 31 tons, is the tons equivalent of one car westbound, and, in the same way, 74.4 divided by 3.23, is equal to 1.067 tons, or the equivalent of the engine resistance.

The following are, therefore, the results of the first tests, and represent the relation of the resistances of the three items named:

Westbound.	Eastbound.
1 ton = 1	1 ton = 1
1 car = 31 tons	1 car = 21 tons
1 engine = 1,067 tons	1 engine = 1,015 tons

As a result of further investigation, and to make use of round numbers as much as possible, the following average relations were decided upon as being nearest correct.

1 ton = 1
1 car = 15, or in round 1 ton = $\frac{1}{15}$ car
1 engine = 30 cars

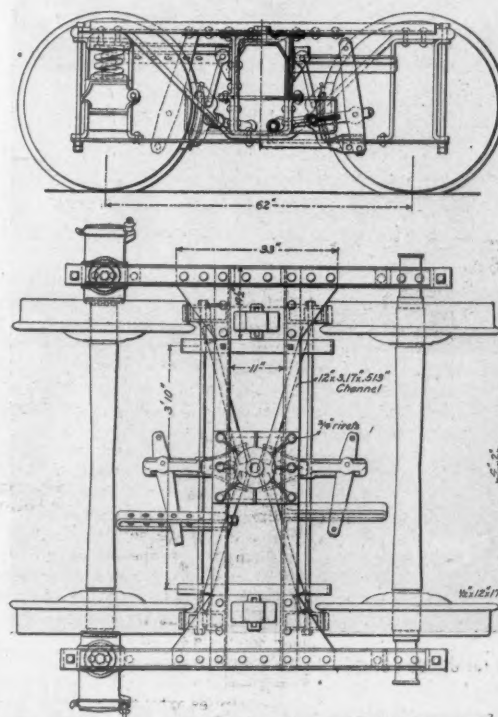
To show how these relations are applied in the calculation of the performance, we will assume a train of 40 cars hauled by a consolidation class "S" freight locomotive, the train weighing, including both cars and lading, 1,000 tons.

The actual cars.....	= 40
The cars equivalent of the tonnage ( $40 \times 1,000$ ).....	= 4
Cars equivalent to the engine.....	= 30
Total adjusted cars.....	= 110

The total adjusted cars multiplied by the car mileage gives the adjusted car mileage.

After obtaining the results of the first tests, it was hardly believed that the ton resistance was so small a part and the car resistance so large a part of the total resistance, and the results were checked by taking a large number of trains both eastbound and westbound, just as they came, including all the engines and engine crews on the division, and merely selecting such trains

basis, where a car is considered a car, whether loaded or empty, and the necessary adjustment is made for the weight, would be the most accurate basis for measuring the work performed by engines and train crews, but for all practical purposes the adjustment on account of the weight could be omitted entirely. It should be borne in mind that this basis for measuring the resistance and the relations between the ton, car and engine has nothing to do with the rating of engines for grades, but

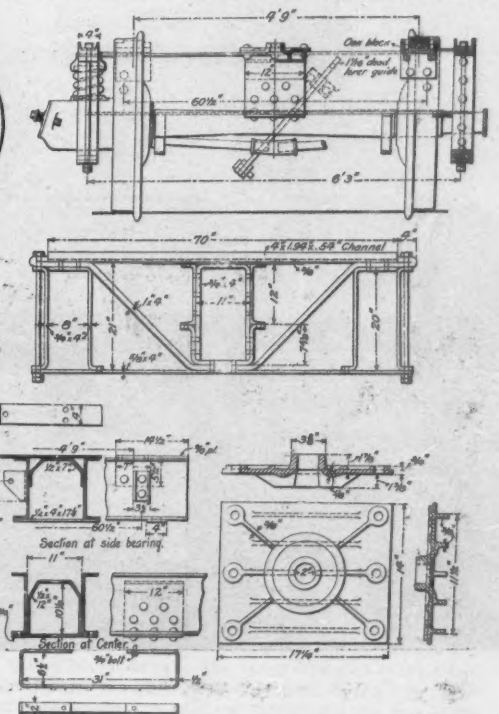


Standard Steel Truck—Mexican Central.

is entirely for the purpose of measuring the work performed in hauling cars from one point to another, including the up grades, down grades and level track. In comparing the cost of locomotive operation on railroads, it is probable that on many roads the car mile, whether

which the upper arch bar is a 4 in.  $\times$  1.94 in.  $\times$  .54 in. straight steel channel 70 in. long; the lower arch bar is formed of a 1 in.  $\times$  4 in. steel bar bent flat on itself 4 in. at either end forming shoulders between which the upper arch bar fits; the tie bar is a straight piece of  $\frac{1}{2}$  in.  $\times$  4 in. steel.

The pedestal at either end of the frame is formed of two steel straps  $\frac{1}{2}$  in. thick  $\times$  4 in. wide, the outer strap being held only by the 1-in. pedestal bolt which



passes through the lower arch bar, end pedestal strap and tie bar while the inner strap is joined to the tie bar by two  $\frac{1}{2}$ -in. rivets, and two  $\frac{1}{2}$ -in. rivets connect the strap at the top with both the upper and lower arch bars. As the end pedestal straps are held only by the



pedestal bolts, the wheels, axles and journal boxes can be removed by jacking up the truck sufficiently to carry the weight and taking out the end pedestal bolts. Double coil springs are used directly above the journal boxes; the outer coil is made from  $1\frac{1}{2}$  in., and the inner  $\frac{1}{2}$  in. round spring steel.

The truck transom is formed of two 12 in.  $\times$  3.17 in.  $\times$

which is riveted to the channel webs; the channels are further joined by a steel plate  $\frac{1}{2}$  in.  $\times$  4  $\times$  17  $\frac{1}{2}$  in. riveted to the lower flanges 4 in. from the end of the transom, which brings it directly against the side frame and relieves the rivets in the end connections from stresses arising from side thrusts. The side bearings are held by bolts with countersunk heads and oak blocks are placed

material entering into its construction in the open market, thus avoiding the use of special shapes. It has also been found from the trucks now in service that it would be possible to use a bar in place of the upper arch channel, but while this would make the truck more symmetrical in appearance the weight of the truck would be increased about 60 lbs. to give the same strength.

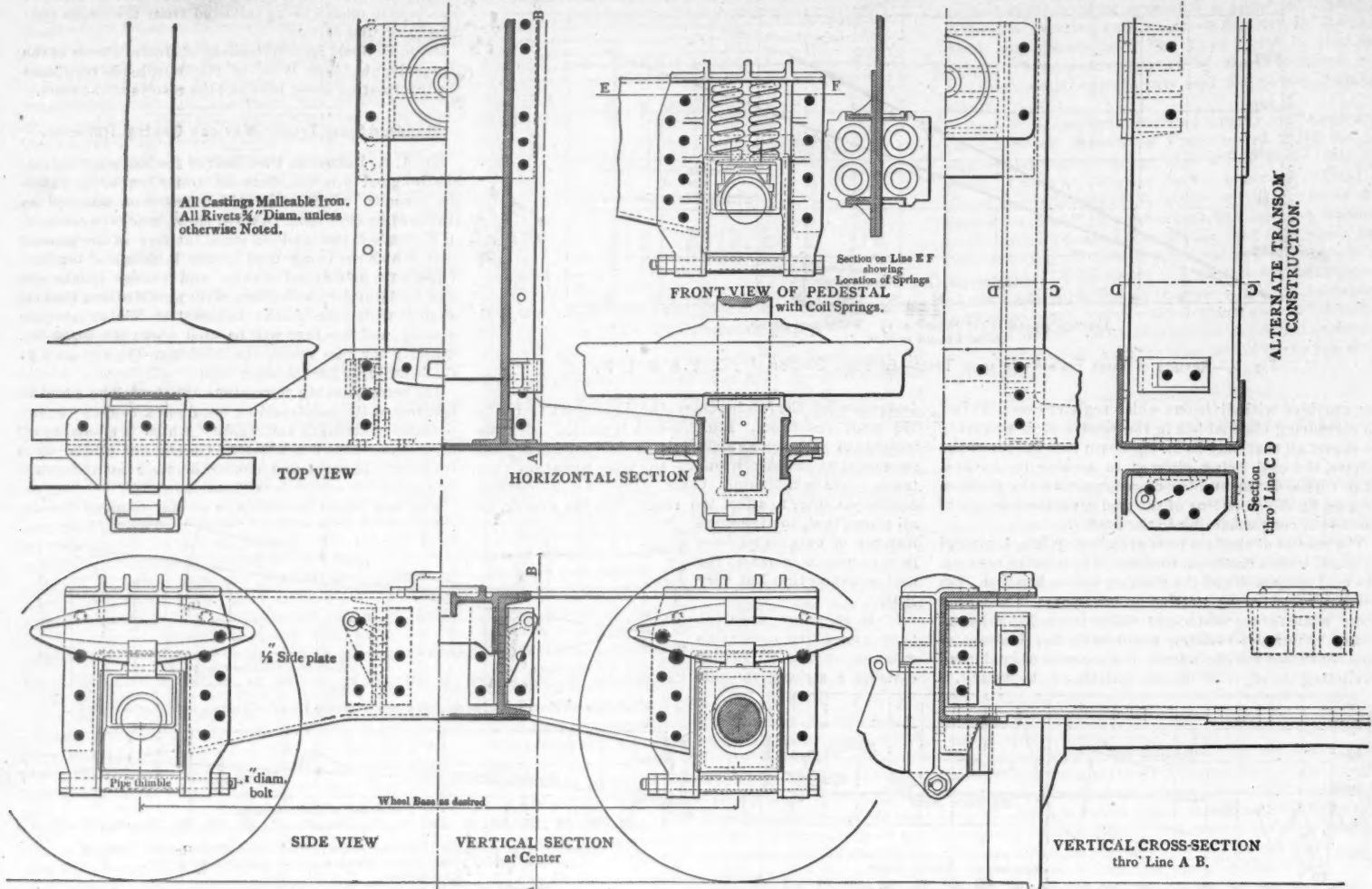


Fig. 1.—Details of the Cloud Truck.

.513 in. steel channels placed 11 in. apart back to back. These are joined at the center by a  $\frac{1}{2}$  in.  $\times$  12 in.  $\times$  17  $\frac{1}{2}$  in. steel plate riveted to the lower flanges of the channels while the lower center plate casting is riveted to the upper channel flanges. The transom is strengthened under the center plate by a  $\frac{1}{2}$  in. thick  $\times$  12 in. wide

between the bearing castings and the transom. This arrangement permits of an easy adjustment of the height of the side bearings, if after the car has been in service the side bearings come in contact.

The transom and frame connections form the columns of the side frame truss. A  $\frac{1}{2}$  in.  $\times$  4 in. strap is placed

The truck frame as shown by the engravings weighs about 1,500 lbs.

#### The Cloud Metal Trucks.

In recent issues of the *Railroad Gazette* we have described a number of different designs for metal car trucks which promise to be of sufficient practical value to warrant attention from railroad men. There still remains a number of metal trucks possessing merit which we have not yet shown, for the reason that the designers have not collected enough data from service to satisfy themselves. In this issue we illustrate the important features of the metal trucks designed and patented by Mr. John W. Cloud.

Fig. 1 shows elevation, plan and sectional views, together with details of the pedestals and the transom construction. Fig. 2 is the truck with cars of 60,000 lbs. capacity, and Fig. 3 is a 100,000 lbs. capacity truck. Fig. 4 shows a car equipped at one end, with a truck having coil springs over the journal boxes, while with the truck at the opposite end elliptic springs are used.

Sixty trucks, similar to the one shown by Fig. 3, are now being built for the hopper cars of the Pittsburgh, Bessemer & Lake Erie, and one pair of 100,000 lbs. capacity trucks is now in use under an excavator belonging to the Chicago & Northwestern. Of the 60,000 lbs. capacity trucks, between 50 and 60 are now in service under cabooses, various kinds of freight cars and loco motive tenders.

The important features of this truck are the side frames, the pedestals and the arrangement of the springs. The transoms are made either of rolled channels secured to the side frames by angles, or of plates pressed into the form of channels. In the latter construction the flanges of the transom members are cut off near the ends, the webs are bent to a right angle and riveted to the side frame plates, which avoids the use of corner angles. Both methods of construction are illustrated by Fig. 1, which also shows the gusset plates, formed by the top and bottom flanges of the side frame, that assist in connecting the frames and transom.

The side frames are cut and flanged out of steel plates, and it will be noted that the top edge of the frame is flanged along a straight line, which not only simplifies the original construction, but should the frame be bent in a wreck it could be re-flanged or straightened in a railroad shop without the use of special tools.

The pedestals are malleable iron castings, which form the upper spring seats, and are riveted to the web and upper flange of the side frame. A web on the pedestal casting and also a section of the frame plate commences 2 in. above the top of the journal box and extends up-



Fig. 2.—Cloud Truck for 60,000-Lb. Car.

steel plate upon which the center casting rests in addition to its bearing on the channels; this plate is securely riveted to the webs of the transom channels.

As shown by the section taken at the side bearing the channels are joined on the top flanges by a  $\frac{1}{2}$ -in. steel gusset plate which also assists in forming the connection between the transom and the side frames. Between the channels and directly beneath the side bearing a steel plate  $\frac{1}{2}$  in. thick  $\times$  7 in. wide is bent to form an angle

as shown inside the transom channels and extends the full depth of the side frame, while a strap of similar dimensions carries the lower channel flanges. The upper gusset plate, the channels and the straps are securely riveted to each other and to the members of the side frame, the connection being clearly shown by the engraving.

We are advised that the chief aim in designing this truck was to enable the road to place orders for all the



ward between the springs, thus forming a double thickness of metal directly over the boxes. The springs, if elliptic, are placed one inside and one outside the frame, and where coil springs are used they are arranged two inside and two outside the frame. On account of the peculiar construction of the top of the frame and pedestals there is room for long elastic springs, and by arranging the springs evenly above the top of each box a uniform distribution of the load on the journals is obtained while the box is also kept perpen-

### The Chicago-Nashville Fast Run.

As noted in the *Railroad Gazette* of May 7, a special train, consisting of an engine, baggage car and one coach, was run April 28 from Chicago to Nashville, Tenn., carrying copies of the *Chicago Times-Herald*. As this was, in view of the conditions, an excellent performance, we give below a record from each of the three roads.

The run was made between Chicago and Terre Haute

from Chicago, for taking water. The engine used on this portion of the run was an eight-wheel Schenectady locomotive with cylinders 18 in. x 24 in., having a total weight of 100,000 lbs., with 65,000 lbs. on the driving wheels.

The road is double-track from Chicago to Danville Junction, 125.5 miles; the rest of the way single. The grades are easy. The curves mostly range from 1 to 3 deg., though in the Danville yard there is a 10 deg. 30 min. curve; but as it was necessary to run slowly through the yard for other reasons, this curve of itself did not interfere with fast running.

Three minutes were consumed at Terre Haute changing engines and between this point and the Louisville & Nashville station at Evansville, five railroad crossing stops were made and a stop for water at Vincennes required three minutes. The Evansville & Terre Haute is single track and the speed had to be reduced while running through the yards at Terre Haute and Evansville.

The engine used on this road was an eight-wheel American type locomotive, with 18 in. x 24 in. cylinders, 65-in. driving wheels, total weight 105,000 lbs., and a weight on the drivers of 80,000 lbs. On account of the damage done to the tracks by the heavy floods in March and April, it was necessary to run carefully at several points, with the result that the distance, 110 1/4 miles was made in 140 minutes, which without deducting stops is at the rate of 47.4 miles per hour. The same distance was covered on a previous occasion, when the tracks were in good condition, in 10 minutes less time. Mr. W. M. Corbett, Superintendent of the Evansville & Terre Haute, has furnished the following record of the train:

#### EVANSVILLE & TERRE HAUTE R. R.

Distance from Terre Haute.	Distance from stations.	Stations.	Time a. m.
.....	.....	Terre Haute ....	7:05
4.9	4.9	Spring Hill.....	7:11
12.0	7.1	Pimento.....	7:19
32.3	.....	Paxton.....	7:41
58.2	.....	Vincennes Ft. Station.....	8:17
80.8	.....	Princeton Jct.....	8:49
81.8	.....	Princeton.....	8:59
92.3	7.7	Ft. Branch.....	9:02
99.0	6.7	Ingles.....	9:18
107.2	8.2	Belt Yard.....	9:25
110.5	3.3	L. & N. Station, Evansville ....	9:25

As noted, the special train was delivered at Evansville to the Louisville & Nashville at 9:25 and engines were changed in two minutes, the train leaving Evansville at 9:27. The engine used on the Louisville & Nashville was an eight-wheel American type locomotive, with

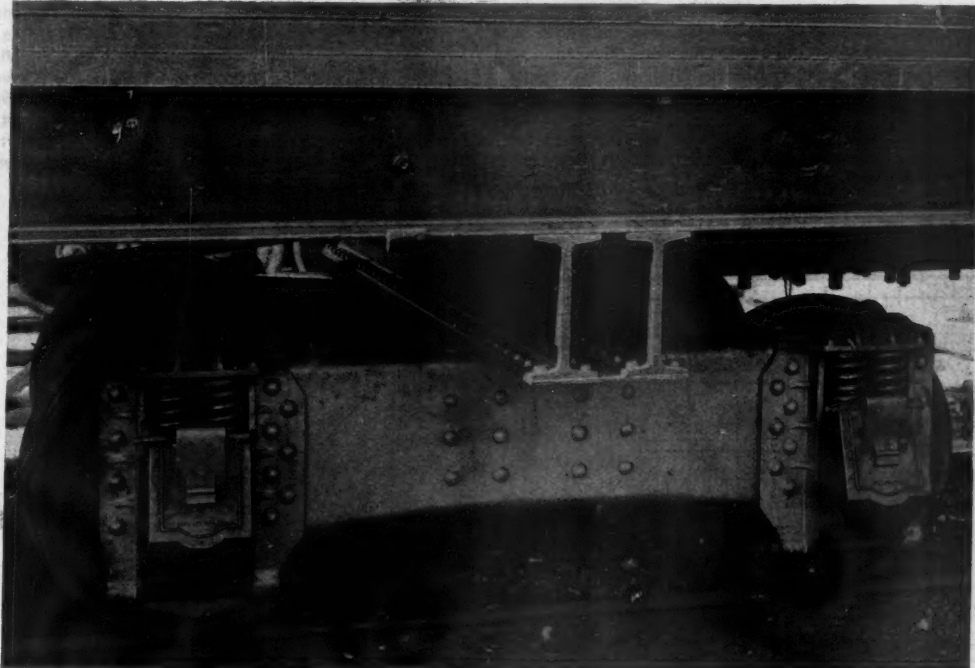


Fig. 3.—Cloud Truck for 100,000-Lb. Car.

dicular, and so does not bind in the pedestals. For cars which have to be hauled with light and with very heavy loads, elliptic springs have been found to give better service than short coils, and especial attention was therefore given in designing this truck to provide means for using either elliptic or long coil springs without cutting away and weakening the frame plates directly over the journal boxes, which would occur if the springs were centrally placed.

Another feature of the pedestal is that the bearing provided for the journal box is 6 in. wide, where commonly the width is 4 or 5 in. This gives additional wearing surface for the box and also assists in keeping the boxes and truck square. At the bottom of the pedestals 1-inch bolts are used with pipe thimbles, which fit between the pedestal legs.

The center plates and side bearings shown in Fig. 1 are of malleable iron, but pressed steel bearings could as well be used.

The following is a list of the material required for the two Cloud trucks for use with 60,000 lbs. and 100,000 lbs. capacity cars:

#### Material for 60,000 lbs. capacity Cloud truck pressed steel transoms. Helical springs. Inside-hung brakes.

- 2 side sheets 2 ft. 4 in. x 6 ft. 6 in. x 1/4 in. soft open-hearth steel.
- 2 pressed open-hearth steel transoms 1 ft. 8 in. x 7 ft. 2 in. x 1/4 in.
- 1 transom tie plate 20 in. x 13 1/4 in. x 1/8 in., soft open-hearth steel.
- 4 pedestals, malleable iron.
- 1 center plate, malleable iron.
- 4 brake hanger brackets, malleable iron.
- 2 side bearings, malleable iron.
- 4 pedestal bolts 1 in. x 17 1/4 in., with 3 hexagon nuts and washers.
- 4 pipe thimbles 1 1/4 in. x 3/8 in.
- 4 button-head rivets, 3/4 in. x 3/8 in.
- 128 button-head rivets, 1/2 in. x 3/8 in.
- Weight of truck frame 1,400 lbs.
- For elliptic springs there would be used 4 less, 3/4 in. x 3/8 in. rivets.

#### Material for 100,000 lbs. capacity Cloud truck, inside-hung brakes.

- 2 side sheets, 2 ft. 5 1/2 in. x 6 ft. 11 in. x 5/8 in. soft open-hearth steel.
- 2 channels, 13 in., 50 lb. per ft., 6 ft. 3 1/4 in. long, steel.
- 1 channel tie plate, 22 in. x 19 1/4 in. x 1/4 in., steel.
- 2 plates, 9 in. x 20 3/4 in. x 3/4 in., steel.
- 2 angles, 8 in. x 3 1/2 in. x 10 3/4 in. x 1/2 in., steel.
- 2 lower side bearings, malleable iron.
- 4 pedestal castings.
- 1 lower center plate.
- 4 brake hanger brackets.
- 4 pedestal bolts, 1 in. x 18 1/4 in., with 3 hexagon nuts and washers.
- 4 pipe thimbles, 1 1/4 in. x 3/8 in.
- 8 heavy washers for upper spring seats, 1 1/4 in. outside diameter x 3/4 in.
- 4 rivets, 3/4 in. x 3/8 in.
- 8 " 3/4 in. x 3/8 in. countersunk.
- 8 " 3/4 in. x 3/8 in.
- 6 " 3/4 in. x 3/8 in.
- 8 " 3/4 in. x 1 1/2 in.
- 56 " 3/4 in. x 3/8 in.
- 13 " 3/4 in. x 3/8 in.
- 36 " 3/4 in. x 3/8 in.
- 20 " 3/4 in. x 3/8 in.
- Weight of truck frame, 2,100 lbs.

We are advised that at the conventions of the Master Car Builders' and Master Mechanics' associations at Old Point Comfort, a car equipped with Cloud metal trucks will be exhibited by Mr. Willard A. Smith, of Chicago, to whom application should be made for further information.

Ind., over the Chicago & Eastern Illinois, from Terre Haute to Evansville, Ind., over the Evansville & Terre Haute, and from this point to Nashville over the Louisville & Nashville. The portion of the run made over each road will be considered separately.

As all trains are required to run at reduced speed within the Chicago City limits, the run on the Chicago & Eastern Illinois should be considered only between Oakdale and Terre Haute, in making comparisons. The following is the record of the train between Chicago



Fig. 4.—Cloud Truck with Elliptical Springs.

and Terre Haute received from Mr. E. P. Broughton, General Superintendent of that road.

#### CHICAGO & EASTERN ILLINOIS RAILROAD.

Distance from Chicago.	Distance between stations.	Stations.	Time a. m.
10.	10.0	Left Chicago.....	3:58
13.6	3.6	Oakdale.....	4:14
16.6	3.0	Kensington.....	4:19
20.1	3.5	Dolton.....	4:23
111.3	.....	Thornton Jct.....	5:23
123.5	12.2	Alvan.....	5:58
126.6	3.1	Danville Jct.....	6:10
151.0	.....	Brewer.....	6:13
154.8	3.8	Worby.....	6:36
167.6	.....	Hillsdale.....	6:39
172.0	4.4	Atherton.....	6:52
177.5	5.5	O. C. Junction.....	6:56
178.0	.5	Terre Haute Yd.....	7:01
		Arr. Terre Haute.....	7:02

Distance from Oakdale to Terre Haute, 168 miles; time, including a 4-minute stop for water, 165 minutes.

A four-minute delay occurred at Rossville, 107 miles

cylinders 18 in. x 24 in., 67 in. driving-wheels; total weight, 100,000 lbs., and weight on the drivers 62,850 lbs.

Four minutes were lost at Earlington and the same at Guthrie taking water; the speed was reduced through Evansville, Howell, Henderson and Earlington yards and over the two crossings at Henderson, and also at the trestle bridge over the Red River. This road has heavy grades and sharp curves, and there is no record of any faster time than that made by this train. The following gives the total number of miles of grades, both ascending and descending, going south, together with the miles of level track:

Total miles of	per cent. grades...	Ascending.	Descending
9	7	7	7
7	7	7	7
13	15	15	15
3	4	4	4
1	1 1/2	1 1/2	1 1/2
level track=50.....			



The official record of the special train, made by Mr. G. E. Evans, Superintendent of Transportation, shows:

## LOUISVILLE &amp; NASHVILLE R. R.

Distance from Evansville	Distance between stations	Name of stations	Time a. m.
		Left Evansville	9:27
54	54	Earlington (arr.)	10:38
85	31	Hopkinsville (left)	10:42 took water.
109	24	Guthrie (arr.)	11:16
		Guthrie (left)	11:44
157	48	Arr. Nashville	12:44

Time through, 157 miles 197 minutes, an average speed of 47.8 miles an hour.

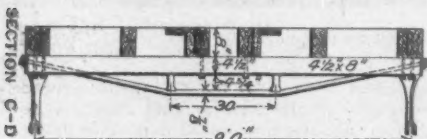
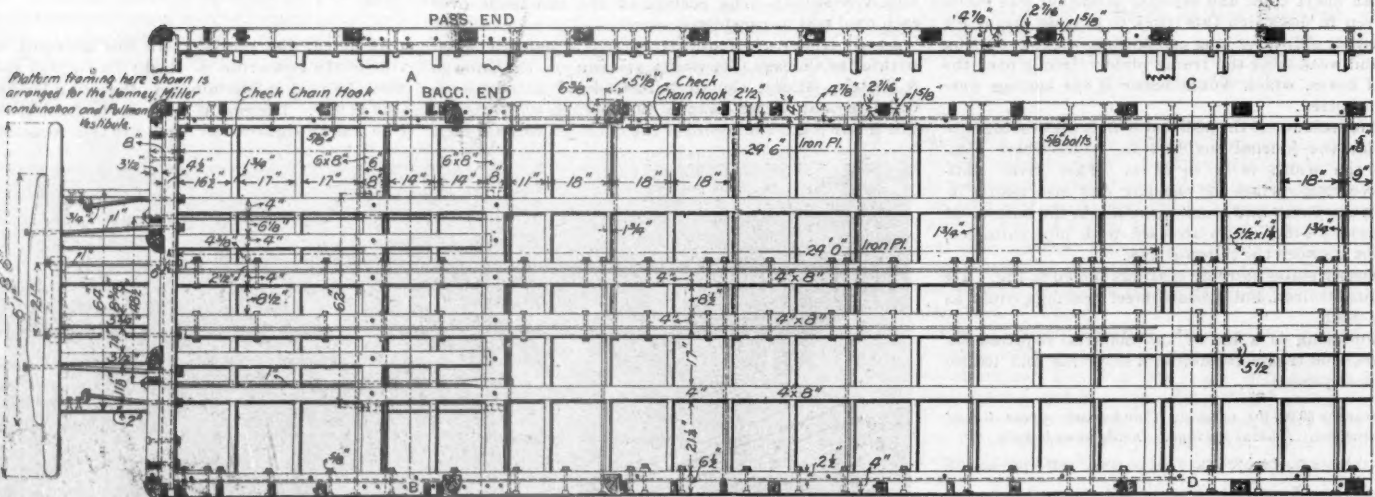
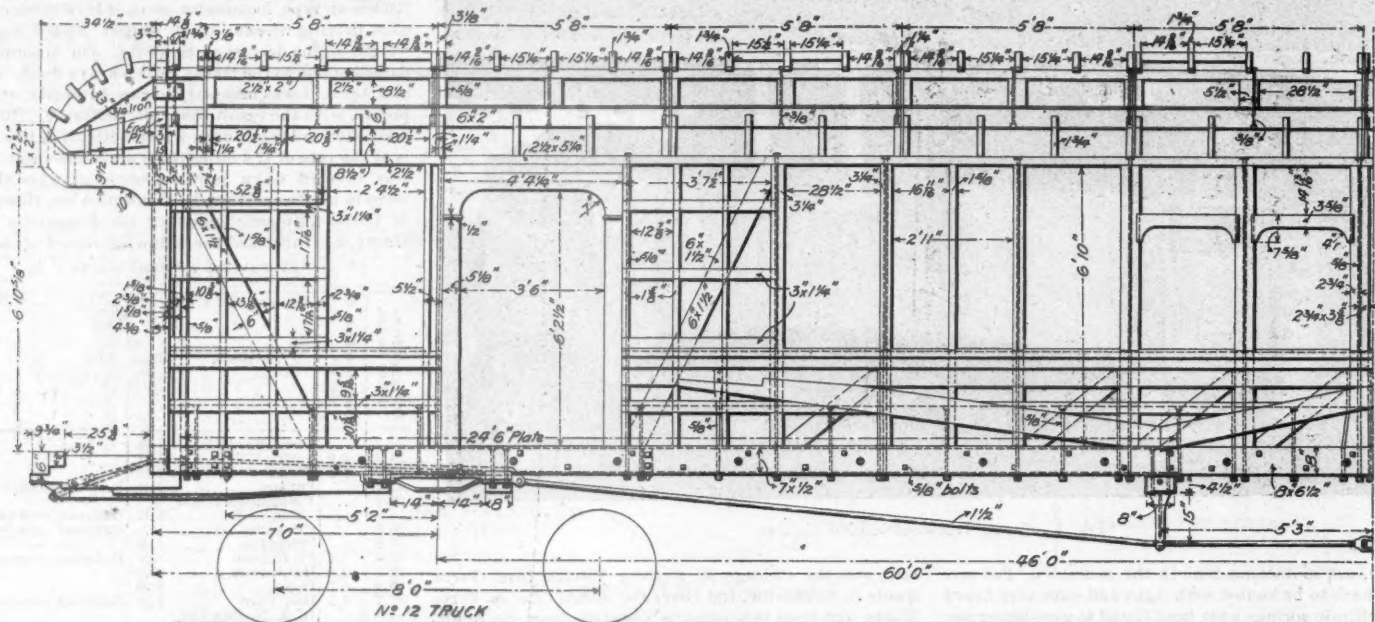
Considering the run as a whole, the distance of 435.5 miles, from Oakdale to Nashville, was made in 535 minutes, equal to 51.7 miles an hour; deducting 15 minutes

Distance from center to center of trucks.....46 ft.  
Inside length of baggage compartment.....20 ft. 8 1/4 in.  
Inside width.....8 ft. 9 1/4 in.  
Seating capacity.....48 passengers

The side sills are of yellow pine 4 in. x 8 in., reinforced with a 2 1/4 in. x 8 in. sub-sill and 1/2 in. x 7 in. iron plates, the sub-sill being gained out to receive the plates, and all bolted together, the plate extending back 24 ft. 6 in. from end sill. The sub-sill has 1 1/2 in. double tenons, 1 1/2 in. long, 2 1/2 in. from the bottom, 1 1/2 in. space between tenons, and has 1 1/4 in. double mortises, spaced to receive bridging on inside of sill. The outer half of the side sill is gained 1 1/2 in. deep at end to receive end-sill, and extends to finish at corner with angle of end sill. The center sills are 4 in. x 8 in., also of yellow pine, reinforced with a 2 1/4 in. x 8 in. sub-sill and 1/2 in. x 7 in. iron plates, the sub-sill being gained out to receive this plate, and all bolted together, the same as in the case of the side sills. This iron plate extends back 24 ft., and is flanged to form

and joined at the center with 1 1/2 in. wrought-iron open turnbuckles. Malleable-iron queen posts are placed at ends of the tie timber to support the body truss rods.

The body bolsters are made of two plates of iron, 1 in. x 8 in. and 1 1/2 in. x 8 in. The ends of bottom plate and the shoulders of the top plate, where they join together, are planed off to fit, and bottom plates sprung sufficiently to be under compression when bolster is finished; and the top plate show at least 1/8 in. deflection when the plates are sprung together. The body truss rod straps are 1 in. x 3 in. iron, shaped to receive bolsters and truss rods. The cross bolsters are formed of double plates of iron, 5/8 in. x 10 1/2 in. and 3/4 in. x 10 1/2 in., which are welded together at the ends. The ends of cross bolsters extend through body bolsters, and have a cast-iron spacing block, placed at each end to fill in the space between the bolsters. Cast-iron thimbles are placed between the plates of cross bolster, and the center-plate bolts pass



lost in taking water and five minutes changing engines, makes the average running speed for the whole distance very nearly 54 miles an hour. The time lost by railroad crossing stops cannot be accurately estimated.

## Combination Passenger and Baggage Cars—Baltimore &amp; Ohio.

The accompanying cuts show in detail the framing and sections of the Class D-9, first-class combination passenger and baggage cars of the Baltimore & Ohio Railroad, which were built last autumn. Especial attention is called to the manner of re-enforcing the sills with iron plates, which makes a very strong car. The general dimensions of this car are:

Length of body outside of end sills.....60 ft.  
Length of body outside of platform end timbers... 63 ft. 11 in.  
Length of window posts between shoulders.....6 ft. 10 in.  
Width of body outside of side sills.....9 ft. 6 in.  
Width of body outside of eaves moulding.....10 ft. 0 1/4 in.

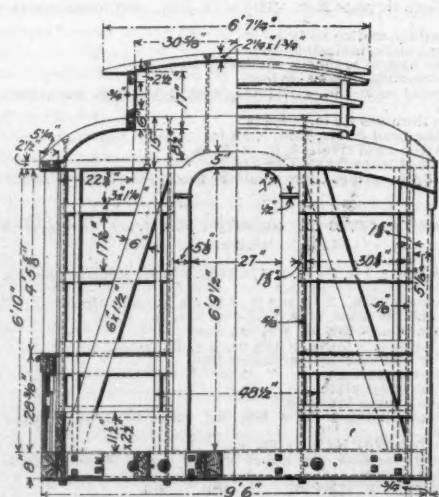
## Combination Passenger and Baggage Car—Baltimore &amp; Ohio Railroad

an angle against the end sill. Center sills have 1 1/2 in. double tenons, spaced same as side sill, and have 1 1/2 in. double mortises, spaced to receive each bridging. The intermediate sills are of the same material, 4 in. x 8 in., and have 1 1/2 in. double tenons, spaced same as side and center sills, and have 1 1/4 in. double mortises, spaced to receive each bridging on both sides of sills. Bridging is 1 1/2 in. x 8 in., and has 1 1/2 in. double tenons on each end to receive sills. Bridging at body bolsters is 6 in. x 8 in., and has 1 1/2 in. double tenons, 1 1/2 in. wide, same as other bridging, spaced in center of bridging. Framing timbers, such as side, intermediate and center sills, are not spliced, but made in one continuous length.

Seat rails 1 1/2 in. x 5 1/2 in. are placed against the center sills, and let into bridging flush with top edge and extending the full length of passenger compartment, as shown. These rails receive the screws which fasten the seats.

The end sills, which are of white oak, are made of two pieces 3 1/2 in. x 8 in. and 4 1/2 in. x 8 in., with 3/4 in. x 3 1/2 in. x 7 in. angle iron gained in between the timbers, making the end sills 8 in. x 7 in. when finished. End sills are fastened to side sills at each end with corner irons and 3/4 in. bolts, and to center sills with 5/8 in. bolts, through flange of sill plates. The end sills are tied to body bolsters with two 1-in. strap bolts, and mortised to receive tenons of all sills.

The needle beams are 4 1/2 in. x 8 in., bolted to sills, and are trussed with 3/8 in. rods, having cast-iron queen posts under the timbers, and cast-iron plates fitted on each end of timber, with truss rods passing through the plates. The body truss rods are of 1 1/2 in. round iron,



through these thimbles. Cast-iron center plates are placed at center of cross bolsters and secured with 3/4 in. bolts. Between the center plate and cross bolster there must be placed a liner of cardboard to insure a good bearing and avoid the breaking of cast-iron center plates.

The inside finish of the passenger end is either of mahogany or oak throughout, no veneer being used. The ceilings of this end are made in large panels by mahogany or oak moldings.

The new specifications of Aug. 1, 1896, for the general car castings used require that three test specimens 1 1/2



able ends for holding in machine, and three drop test specimens 1 in. square and 18 in. long, must be cast with each day's output. The tensile test specimens, when tested in the rough, must have a tensile strength of not less than 20,000 lbs. per sq. in. Drop test specimens, in the rough, when resting on firm supports 12 in. apart, must stand 5 blows of a 10-lb. weight, striking midway between the supports, the first blow falling 12 in., the height of each succeeding blow being increased 1 in. By the specifications of July 1, 1896, for bar iron, all material is rejected that varies more than 2½ per cent. from the estimated weight per running foot. One sample is selected from every 50 bars or less, and from the results of the test of this sample, the 50 bars are accepted or rejected. The iron must show an ultimate strength of not less than 48,000 lbs. per sq. in.; an elastic limit of at least 25,000 lbs., an elongation of at least 18 per cent. in 8 in., and a

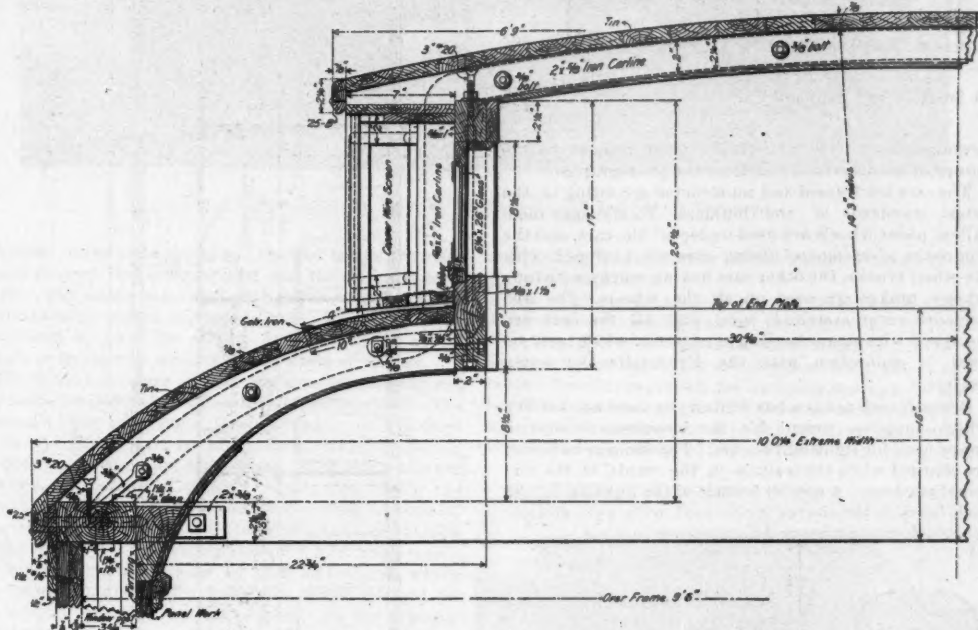
The suit was a challenge of the view, declared by the Supreme Court in the *Social Circle* case, that the Interstate Commerce law neither expressly nor by necessary implication confers the power to fix rates; that, in the language of the late Justice Jackson:

"Subject to the two leading prohibitions that their charges shall not be unjust or unreasonable and that they shall not unjustly discriminate, so as to give undue preference or disadvantage to persons or traffic similarly circumstanced, the act to regulate commerce leaves common carriers as they were at the common law, free to make special contracts looking to the increase of their business, to classify their traffic, to adjust and apportion their rates so as to meet the necessities of commerce, and generally to manage their important interests upon the same principles which are regarded as sound, and adopted in other trades and pursuits."

As the question involves "billions of dollars of railroad property and the transportation of millions of passengers and millions of tons of freight annually" the

for publication, for advancing and reducing rates, and requires conformity to such rates under penalty. "Now, but for this act it would be unquestioned that the carrier had the right to prescribe its tariff of rates and charges, subject to the limitation that such rates and charges should be reasonable. This section 6 recognizes that right, and provides for its continuance. It speaks of schedules showing rates and fares and charges which the common carrier has established and which are in force." It does not say that the schedules thus prepared, and which are to be submitted to the Commission, are subject, in any way, to the latter's approval."

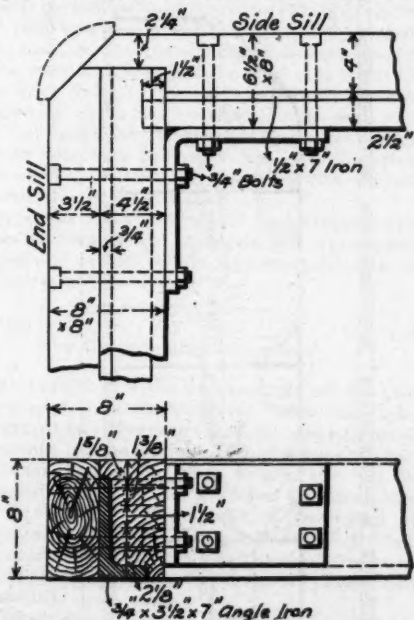
"The power to prescribe a tariff is a legislative and not an administrative or judicial function, and, having respect to the large amount of property invested in railroads, the various companies engaged therein, the varying and diverse conditions attaching to such carriage, is a power of supreme delicacy and importance. That Congress has transferred such a power to any adminis-



Combination Passenger and Baggage Car—Baltimore & Ohio Railroad.

fibrous fracture. Bars ½ in. thick or less will be accepted if the tensile strength is above 47,000 lbs. per sq. in., elastic limit above 24,000 lbs. and the elongation above 15 per cent. in 8 in.

The cars are equipped with Westinghouse air-brakes, automatic air-train signal and Pintsch gas apparatus. They are fitted with 36 in. standard steel-tired wheels



Detail of Framing—Baltimore & Ohio Combination Car.

and are heated by steam. The cars are painted the standard blue color, ornamented with gold, and are fitted with Wheeler seats.

#### The Supreme Court on the Powers of the Interstate Commerce Commission.

The decision of the Supreme Court of the United States denying the power of the Interstate Commerce Commission to prescribe rates for transportation of freight, which was partially reported in the *Railroad Gazette* last week, is No. 733 of the October term, and is devoted entirely to the question, certified by the Court of Appeals "Had the Interstate Commerce Commission jurisdictional power to make the order" to the Cincinnati, New Orleans & Texas Pacific and other roads to adopt certain reduced rates on freight from Cincinnati and Chicago to Chattanooga and other Southern cities. The opinion is by Justice Brewer. Justice Harlan dissented,

Court decided to re-examine the question in its entirety, and in stating the case says:

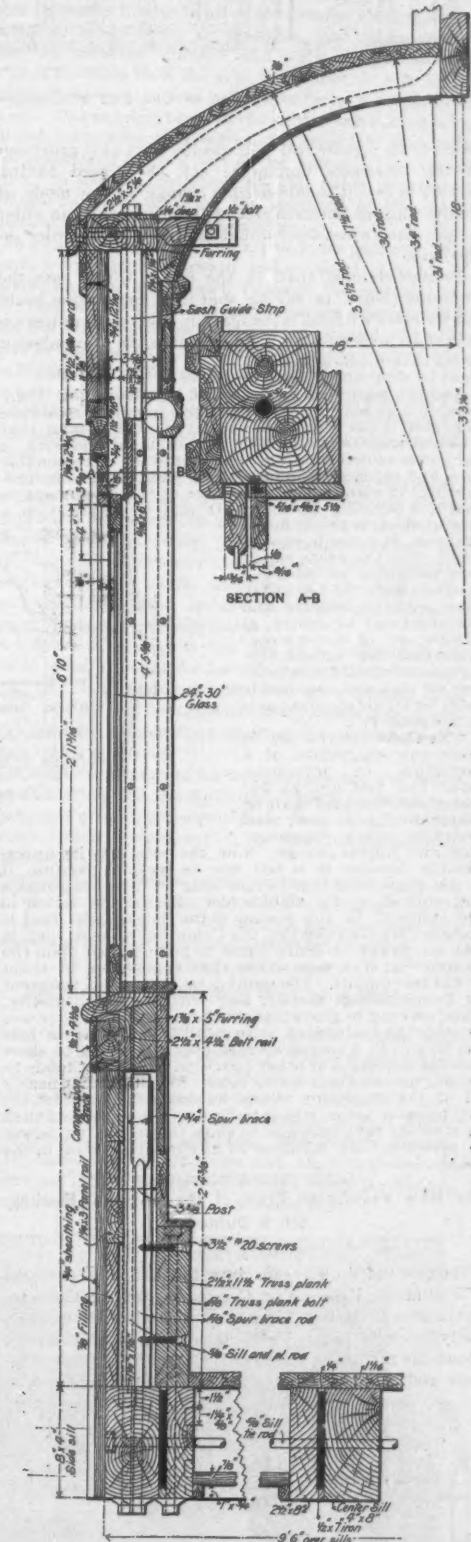
"The question debated is whether it vested in the Commission the power and the duty to fix rates; and the fact that this is a debatable question, and has been most strenuously and earnestly debated, is very persuasive that it did not. The grant of such a power is never to be implied. The power itself is so vast and comprehensive, so largely affecting the rights of carrier and shipper, as well as indirectly all commercial transactions, the language by which the power is given had been so often used and was so familiar to the legislative mind and is capable of such definite and exact statement, that no just rule of construction would tolerate a grant of such power by mere implication. Administrative control over railroads through boards or commissions was no new thing. It had been resorted to in England and in many of the States of this Union. In England, while control had been given in respect to discrimination and undue preferences, no power had been given to prescribe a tariff of rates. In this country the practice had been varying."

Here the decision quotes the laws of 11 states, in which commissioners are empowered to prescribe rates, and of five others in which this power is not granted; and by a review of these statutes shows the difference between inquiring whether rates which have been charged and collected are reasonable (a judicial act) and prescribing rates which shall be charged in the future (a legislative act.) Justice Brewer here goes on to discuss various clauses in the Interstate Commerce law, none of which empower the Commission to prescribe rates. Section 1 does indeed require that all charges shall be reasonable and just and section 12 authorizes the Commission to execute and enforce the provision of the act;

"And the argument is that in enforcing and executing the provisions of the act it is to execute and enforce the law as stated in the first section; that it cannot enforce this mandate of the law without a determination of what are reasonable and just charges; and as no other tribunal is created for such determination, therefore it must be implied that it is authorized to make the determination, and, having made it, apply to the courts for a mandamus to compel the enforcement of such determination. We do not think this argument can be sustained. If there were nothing else in the act than the first section commanding reasonable rates, and the twelfth empowering the Commission to execute and enforce the provisions of the act, we should be of the opinion that Congress did not intend to give to the Commission the power to prescribe any tariff and determine what for the future should be reasonable and just rates. The power given is the power to execute and enforce, not to legislate. The power given is partly judicial, partly executive and administrative, but not legislative."

The President of the United States must take care that the laws be faithfully executed, but it will not be argued that the President by implication possesses the power to make rates for carriers engaged in interstate commerce. For more than a hundred years it has been the affirmative duty of the courts "to execute and enforce" the common law requirement that "all charges shall be reasonable and just," and yet it has never been claimed that the courts, by implication, possessed the power to make rates for carriers.

But the Interstate Commerce act is not silent on the power to make rates. Section 6 requires the railroads themselves to publish tariffs, and lays down regulations



trative body is not to be presumed or implied from any doubtful and uncertain language. Incorporating into a statute the common law obligation resting upon the carrier to make all its charges reasonable and just, and directing the Commission to execute and enforce the provisions of the act, does not by implication carry to the Commission the power to exercise the legislative function of prescribing rates which shall control in the future. The grant to the Commission of the power to prescribe the form of the schedules, and to direct the place and manner of publication of joint rates, thus specifying the scope and limits of its functions in this respect, strengthens the conclusion that the power to prescribe rates is not among the powers granted to the Commission. . . . These considerations convince us that under the Interstate Commerce act the Commission has no power to prescribe the tariff of rates which shall control in the future, and, therefore, cannot invoke a judgment in mandamus from the courts to enforce any such tariff by it prescribed."

But has the Commission no functions to perform in

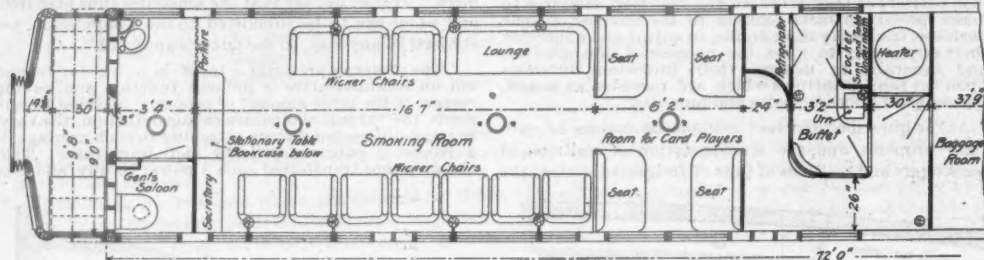


respect to the matter of rates, no power to make inquiry in respect thereto? Unquestionably it has; most important duties. The decision here goes on to recount the specific duties of the Commission as prescribed in the law.

Justice Brewer refers to the statute of Nebraska, of 1887, under which the Supreme Court of that state issued a mandamus compelling obedience by a railroad to an order of the Board of Transportation of that state, prescribing rates, but he says that the Nebraska law

from the outside a uniformly fine appearance. A composite baggage, smoking and buffet car heads the train, followed, in the order named, by a straight 16-section sleeping car, a compartment sleeper, a chair car, a first-class day coach and a dining car.

The forward end of the composite car is without a platform, making a larger space available in the baggage compartment. All other cars have platforms and wide vestibules, the vestibule on each car being 2 ft. 6 in. long by 9 ft. wide. The floor plans show the general



Plan of One End of Combination Smoking and Baggage Car.

(section 17) is more full and specific than any provision of the Interstate Commerce act, the Board having power, in case it should deem a change in the mode of conducting the business of a railroad necessary in order to prevent unjust discrimination, to make an order on the road.

Counsel claimed that, in the Social Circle case, the Supreme Court, in saying that the Commission could not fix rates without investigation, said by implication that if an investigation had been made the Commission could have made a rate:

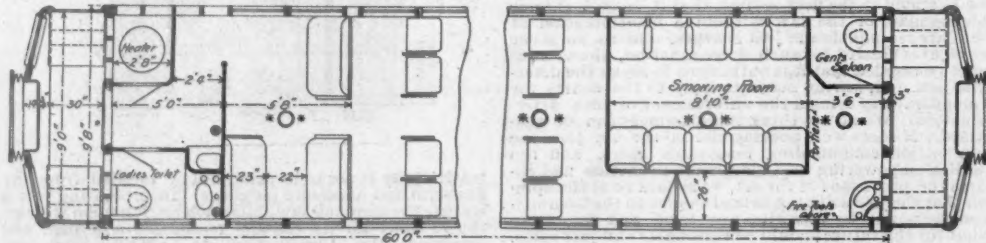
"And the argument is now made, that while the Commission may not have the legislative power of establishing rates, it has the judicial power of determining that a rate already established is unreasonable, and with it the power of determining what should be a reasonable rate, and enforce its judgment in this respect by proceedings in mandamus. The vice of this argument is that it is building up indirectly and by implication a power which is not in terms granted. It is not to be supposed that Congress would ever authorize an administrative body to establish rates without inquiry and examination; to evolve, as it were, out of its own consciousness the satisfactory solution of the difficult problem of just and reasonable rates for all the various roads in the country.

"Nowhere in the act is there any suggestion of a maximum or minimum rate. The first section declares that the rates shall be reasonable and just, and prohibits every unreasonable and unjust charge. Now, the rate may be unreasonable because it is too low as well as because it is too high. In the former case it is unreasonable and unjust to the stockholder, and in the latter to the shipper. In the matter of the Chicago, St. Paul & Kansas City Railway Co., the Commission held that it had no power to order rates to be increased upon the ground that they were so low that persistence in them would be ruinous. The opinion in that case, prepared by Commissioner Cooley, and with his usual ability, while seeking to prove that the Commission has no power to prescribe a minimum or to establish an absolute rate but only to fix a maximum rate, goes on further to show how the operation of other provisions of the act tends to secure just and reasonable rates. We think that nearly all of the argument which he makes to show that the Commission has no power to fix a minimum or establish an absolute rate, goes also to show that it has no power to prescribe any tariff, or fix any rate to control in the future."

#### The New Vestibuled Train of the Chicago, Burlington & Quincy.

[WITH AN INSET.]

The new vestibuled train just finished at the works of Pullman's Palace Car Company, for the Chicago, Burlington & Quincy, is a very completely equipped and finely finished train. It will be put in regular service about the middle of June, and will run between Chicago and St. Paul and Minneapolis. Going north it



Plan of Chair Car.

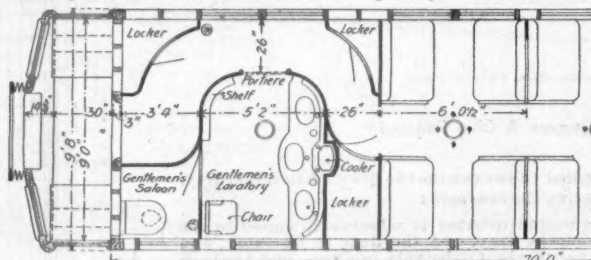
will leave Chicago at 6:30 p. m., arriving in Minneapolis at 8:25 the following morning; on the return trip it will leave Minneapolis at 7:20 p. m., and arrive in Chicago at 9:25 the next morning. It will be seen that this train is so scheduled as to be on the road mostly at night, and in its design and construction especial attention has been given to matters pertaining to lighting and to sleeping accommodations and toilet arrangements.

The train is made up of vestibuled cars, which present

arrangement of the cars, while a good idea can be obtained of the interior finish from the photographs.

The cars are framed and constructed according to the latest standards of the builders. Thirty-eight inch, Allen, paper wheels are used under all the cars, and the composite, sleeping and dining cars are equipped with six-wheel trucks, the other cars having trucks with four wheels; brakes are used on all the wheels. The air-pressure water system is used, and all the cars are equipped with steam-heating apparatus, which can be used in connection with the Frumveller hot-water heaters.

Beneath each car is a box containing a storage battery which supplies current for the incandescent electric lamps used for lighting the cars. The storage batteries are charged while the train is in the yards at the terminal stations. A special feature of the lighting is that each berth in the sleeper is provided with two electric



Plan of One End of Sleeping Car.

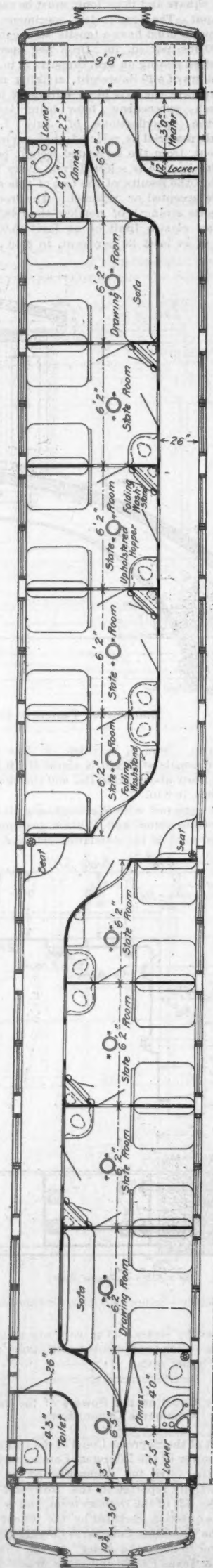
reading lamps placed at the ends of the sections. Heretofore where such lamps were used only one was placed for each section requiring part of the passengers to ride backward if they desired to read. The lamps in this car are provided by the porter when desired by passengers and the lights are turned on or off by inserting or withdrawing the bulbs from the lamp sockets. The train is, in addition to the electric light, equipped for using Pintsch gas lamps, which are placed in the roof as usual. These lamps are of a special and very handsome design.

Rubber tiling of specially designed patterns and colors to suit the immediate surroundings is used for coverings in all the toilet-rooms, passageways and on the platforms between the cars.

The most interesting feature of this train is not so much the construction of the cars proper as the arrangement, finish and decoration of the interior, which has been carefully considered to the smallest detail. An idea can be gained of the inside appearance of the cars from the photographs reproduced, but the full effect can only be got by an inspection of the train, as the coloring plays such an important part in the decoration. The aim in the decorations has been to get artistic and elegant effects, and yet with materials suitable for railroad service; broad surfaces of selected veneers inlaid

with different-colored woods were therefore adopted in place of heavy molded panels and carvings.

The composite car is 72 ft. long and contains a 37-ft. 9-in. compartment for baggage, a fully equipped buffet for light refreshments and a smoking and reading room. The latter is fitted with upholstered cane chairs and lounges, book cases and writing tables. The smoking-room is finished in inlaid vermilion wood, the prevailing color of the furnishings being empire green. Triple windows are used, which are arched over in the clear



Floor Plan of Compartment Sleeping Car—Chicago, Burlington & Quincy.



story, and the electric lights are arranged along the sides of the car.

The 16-section sleeper is 70 ft. long and is finished in East Indian vermillion wood, which forms the ground for an inlay of six different varieties of colored woods. A new feature which is used in this car is the decorative screen dividing the car into two equal parts. The ceiling, which is royal blue, is an arch with vaulted

for carrying ore, pig iron or any heavy material, but they are designed particularly for the coal and grain trade, being so built that all joints and valves are absolutely tight, thus preventing any possible leakage of small material. An adjustable steel cover is provided for the grain service, making practically a closed car, and giving protection against storms or theft. For carrying coke or other light material a steel grate top is

The dumping mechanism is similar to that used heretofore, and is so arranged as to be operated either by compressed air or by a system of levers worked by hand.

The car is divided by a center bulkhead of steel, and the discharge of each of the two compartments thus formed is controlled at its own end of the car. The dumping mechanism of the former eight-wheel cars was described in considerable detail in the *Railroad Gazette* of Dec. 6, 1896. The load is carried by four valves, the two center valves being supported at their inner and lower edges by central steel rock shaft (each compartment having its own shaft), and at their outer edges by malleable iron struts. The two side valves are in turn supported at their lower edges by the center valves, which they overlay, and at their upper edges by link hinges carried by brackets attached to the side girders.

The changes to permit of center dumping have been made in the discharge apron, which is placed below the valves. This apron, which in the former eight-wheel cars was entirely rigid, is now made hinged at a point near its center line, as in all of the company's four-wheel cars, the hinge being so arranged that the inner part may be revolved upward and outward. When it is wished to dump from the side, this apron is left in its original position, so that both parts form a continuous sheet. The support beneath the center valve strut is removed, permitting that valve to fall until it is flush with and practically forms a part of the apron. This center valve, in falling, releases the side valve, which then swings outward, allowing the contents of the car to slide out at the side, over the apron.

To dump through the center, the inner portion of the apron is first swung upward and outward on its hinge, leaving an open space down through the center of the car; then when the carrying valves are released as before, the inner valve swings downward, and the outer valve swings outward until it comes into contact with the hinged part of the apron, so that the contents of the car pass down through the opening thus made. In the case of either side or center dumping, the discharge follows practically instantaneously after the release of the valves.

As was before stated, the releasing of these valves may be done by compressed air or by hand, the use of the compressed air permitting any number of cars to be dumped simultaneously. The arrangement of the dumping mechanism and the fact that each compartment has its own shaft, prevents any sticking of the parts and consequent failure to work that might be caused by sagging or side warp.

A feature of this car is the use of a ball-and-socket center plate, allowing for lateral movement with comparatively little grinding action and consequently little wear. Spring side bearings are used, which give a constant pressure against the bottom of the car and greatly lessen shock at curves.

The working drawings for this car are not yet ready for publication, but the *Railroad Gazette* proposes, in a subsequent article, to present these drawings, by which further details of construction and the dimensions may be shown.

Further particulars in regard to the cars made by the Goodwin Car Co. may be had upon application to its New York office, No. 96 Fifth avenue, and the car will be shown at the conventions at Old Point Comfort.

#### Railroads of the World at the End of 1895.

The *Archiv für Eisenbahnwesen* for May-June contains the table of railroad statistics for the world which that carefully edited journal publishes every year. The statistics now collected are to the end of 1895. We have converted the figures of absolute length, and of length relatively to population and area. The *Archiv's* figures are, of course, in metric units and the conversion is tedious and errors are liable to have crept in; but we have taken reasonable pains to avoid them.

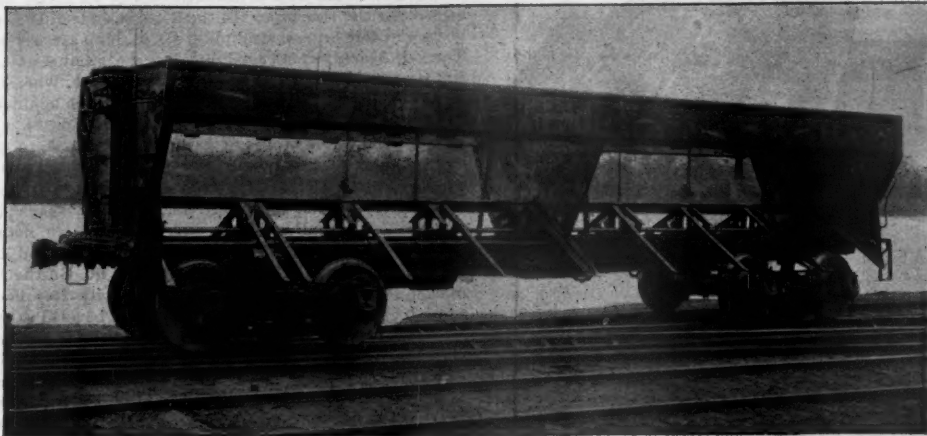


Fig. 1.—The Goodwin Steel Dump Car—Aprons and Valves Removed.

windows in the clear-story, and the gas lamps are made the centers of the designs used for the ceiling decorations. The seats are covered with royal blue plush of a special design and an embossed figure is worked on the seats and backs. The carpets and trimmings are of colors to harmonize with the other parts of the car.

The toilet-rooms are special features of this car and are more complete than those heretofore provided. The women's toilet-room has a large dressing table in front of an oval mirror, and at either side of the table there is an open polished nickel wash stand. The side walls are paneled and colored a delicate Nile green, while the frames of the panels and the wainscoting are inlaid. The ceiling of this room is tinted green and decorated in gold. The men's toilet-room has a triple wash stand, above which are mirrors set to form an octagon, which are framed in inlaid white holly; the alcove formed by the mirrors contains the water cooler. In the passageways single panels extend from the floor to the ceiling.

The compartment sleeping car is 69 ft. 10 in. long, and in addition to the two drawing-rooms, one at either end, there are seven staterooms.

These rooms are finished in Circassian walnut, vermillion and different varieties of mahogany, which form the ground for inlaid work similar in design to the sleeper. Each room has a separate scheme of color with upholstery and carpets to harmonize.

The chair car and day coach are each 60 ft. long. The chair car is provided with 36 Scarritt (Forney) full, reclining, high-back chairs and has toilet and smoking rooms at the ends. The day coach is fitted with Scarritt high-back seats with especially designed ends to suit the other interior finish. This car also has an enclosed smoking-room. Both cars are finished in the same style and are very handsome. The cabinet work is mahogany, inlaid with satin wood and tulip. The seats are upholstered in royal blue plush corresponding with the ceilings, which are decorated in gold.

The dining car which will be used in connection with this train has been in service before, but was recently overhauled and finished within to correspond with the rest of the train.

#### The Goodwin Steel Dump Car.

In 1872 a small four-wheel wooden dump car was patented by the late John M. Goodwin. Since that time subsequent patents have been taken out, covering many improvements, but the original principles remain practically the same. This four-wheel wooden car was illustrated and described in the *Railroad Gazette* of July 16, 1886. In the issue of Dec. 6, 1895, a description of the "New Goodwin Dump Car" (capacity 60,000 lbs.) was given, and on Sept. 11, 1896, the "New and Improved Steel Frame Goodwin Dump Car" (capacity 125,000 lbs.) was illustrated.

The Goodwin Car Co. has recently built a new eight-wheel dump car which embodies a number of improvements over those already described. The general features of this car are shown in the accompanying engravings. Fig. 1 shows the car with its valves and aprons removed, revealing the supporting mechanism; Fig. 2 is an end view of the car in its carrying position, and Fig. 3 shows the car in its center dumping position.

This car is built entirely of steel and malleable iron, no wood being used in any of its parts, and is about 6,000 lbs. lighter than the former eight-wheel cars built by the company, with the same carrying capacity (125,000 lbs.).

The company has always built its four-wheel cars to dump either from the side or through the center, but heretofore the eight-wheel cars dumped only from the side. The eight-wheel cars as now built are both side and center dumping, being so modified and improved as to combine all the principles of the smaller car, with the greater carrying capacity. These cars may be used

designed, to be placed over the car and thus bring it up to its full capacity.

The original eight-wheel cars of this company were supported on four longitudinal sills consisting of 12-in. steel I-beams, 35 ft. long, these beams being firmly held together by wrought iron straps placed both above and below. In order to provide for dumping through the center, it was necessary to make a different arrangement of sills, and in the new cars only two sills, or girders, are used. These girders, which are of the same length as



Fig. 2.—The Goodwin Steel Dump Car.

those in the former eight-wheel car, are placed 21 in. apart, center to center, giving room for the material to pass between them in the center dumping operation. One of these sills is shown in position in Fig. 1.

A change has also been made in the shape and construction of the sills, which are now built up of plates and angles, forming a girder 18 in. deep at the center and 9½ in. deep at the ends. This gives greater strength with much less weight, as the construction and shape of the beam does away with useless material, and at the same



Fig. 3.—The Goodwin Steel Dump Car—Center Dumping Position.

time provides the greatest resistance at the point where the breaking strain is most directly applied. As may be seen in Fig. 1, a part of the load is carried on these girders on each end, outside of the point of support at the center of the truck, thus using the cantilever principle and greatly reducing any tendency toward sagging at the center.

It will be noticed that relatively to population the United States has much more railroad than any other great country—more than 48 times as much as Germany, five times as much as Great Britain and Ireland, more than four times as much as France, more than six times as much as Austria-Hungary and more than 12 times as much as Russia. In rate of increase, however, Russia has



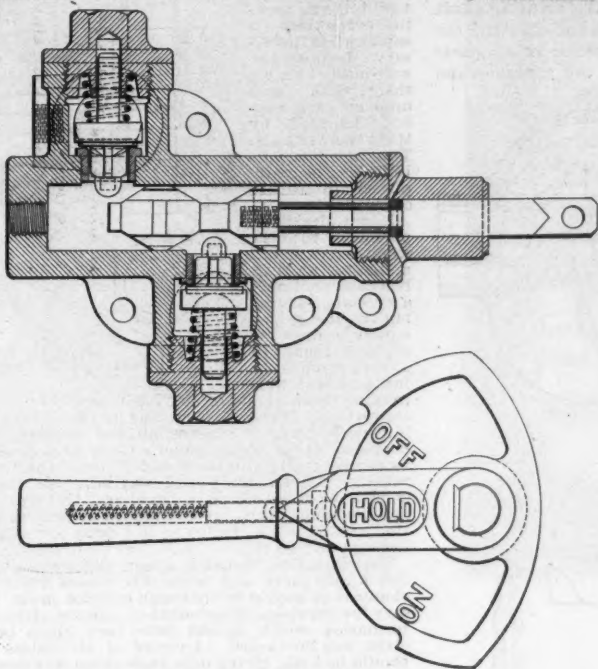




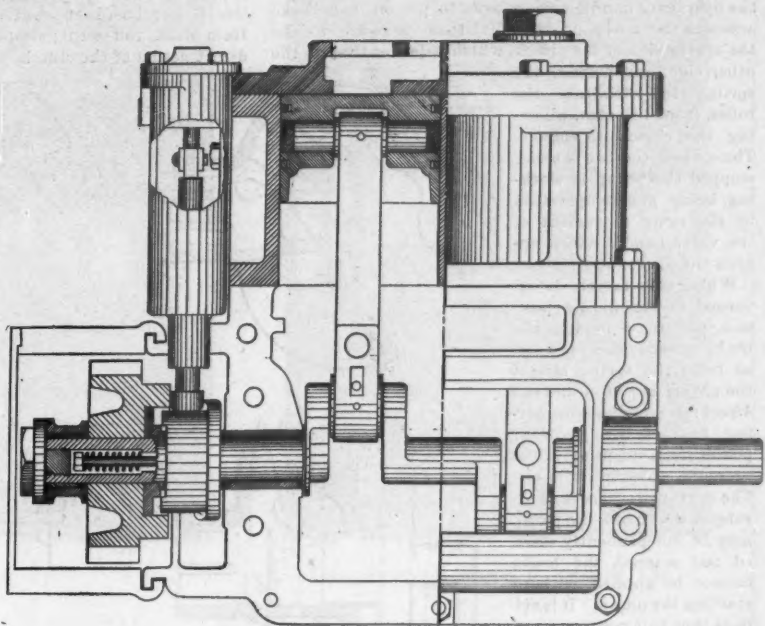
2. Special instructions, given by proper authority, must be observed while in force.
3. Employees are required to be conversant with and obey the rules and special instructions. If in doubt as to their meaning they must apply to the proper authority for an explanation.
4. Employees must pass the required examinations.
5. Persons employed in any service on trains are subject to the rules.

4. Failure of any part directly controlling a signal to cause it to give the normal indication.
5. Where the semaphore is used the arm displayed to the right of the signal mast as seen from an approaching train.
6. The signals, if practicable, either over, or upon the right of and adjoining, the track upon which trains are governed by them.
7. The normal indication of Home signals—Stop (of Distant signals—Caution).
8. Where distant signals are used, bolt locking, or its equivalent.

and we recently had an opportunity to see its working in Yonkers on long and steep grades, and can testify that so far as our observation went it performed perfectly. The control of the car was quick and accurate and the reservoir pressure remained very steady all the way down the grades, and in some instances was greater at the foot of the grade than at the top.



Running Valve and Valve Handle—Howe Brake.



Pump and Governor for Howe Air-Brake.

6. Employees, while on duty, must wear the prescribed badge or uniform and be neat in appearance.
7. The use of intoxicants, while on duty, is prohibited. Their habitual use, or the frequenting of places where they are sold, is sufficient cause for dismissal.
8. The use of tobacco by employees when in or about passenger stations, or by passenger trainmen when on duty, is prohibited.
9. Persons authorized to transact business at stations or on trains must be required to conduct themselves in a quiet and orderly manner, without annoyance to passengers.
10. In case of danger to the company's property employees must unite to protect it.

11. Detector bars, or their equivalent, for all facing point switches in main routes.
12. For mechanical interlocking, pipes or their equivalent, properly compensated, connecting levers with switches and locks.
13. Latch locking or its equivalent.
14. The established order of interlocking between the levers or other apparatus shall be such that—

Before the lever clearing the home signal can be operated, diverging switches, if any, in conflicting routes must be in their normal position, the required route set and its switches locked.

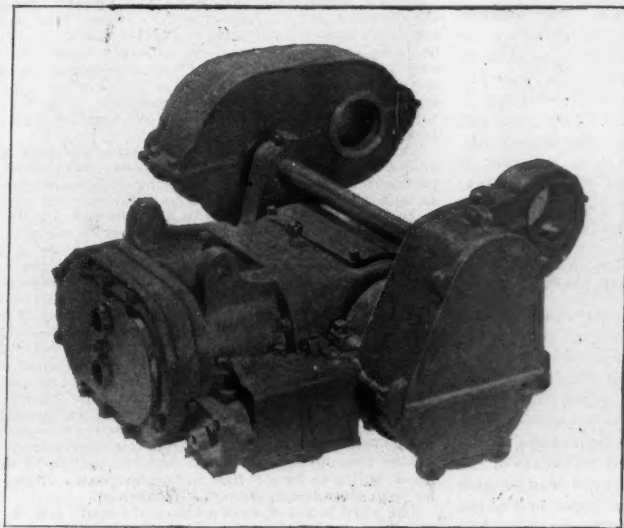
The display of a clear home signal shall lock all switches and locks in the route as far as such signal gives permission to proceed, locking all opposing or conflicting signals and releasing the corresponding distant signal where such signal is used.

Where distant signals and diverging switches are used, the display of a clear distant signal shall lock the home signal in the clear position, and shall lock the diverging switches at railroad crossings, drawbridges and junctions, so that the

It will be observed that the power for compressing the air is taken from the axle of the car. The designer has aimed to economize power by disconnecting the air pump, except during the application of the brake or when pressure has fallen below the normal and by starting the pump simultaneously with the application of the brake. The automatic governing feature is supplemented by a positive device and is not depended on alone for controlling the apparatus when a supply of air is needed.

The complete apparatus consists of the pump and automatic governor, the operating valve, the air reservoir and the brake cylinder. The pump is secured to the truck frame on crossbars and a train of gearing connects it with the axle. The other parts are placed with a view to the greatest convenience in construction, maintenance and working.

The pump described and shown was designed for high speed, heavy electric cars in city, suburban or interurban service. It has two cylinders with trunk pistons packed with rings. On one end of the cylinders a case is extended to include the crank-shaft journals, and this case is made tight to hold oil. The connecting rods are attached to the pistons and to the cranks, as shown in the engraving. The cranks are set at 180 deg. Thus, while one piston is compressing the other is drawing air into the other cylinder. The valves are put in the cylinder



Air Pump and Governor—Howe Brake.

11. Employees must render all the assistance in their power in carrying out the rules and special instructions.
12. Any violation of the rules must be reported.

The following definitions and regulations were discussed, but not formally acted upon.

#### INTERLOCKING. Definitions.

**INTERLOCKING.**—The arrangement by which an assemblage of switch, lock and signal appliances are so interconnected that their movements must succeed each other in a predetermined order.

**INTERLOCKING PLANT.**—An assemblage of switch, lock and signal apparatus, interlocked.

**INTERLOCKING CABIN.**—The building in which the levers, or their equivalent, for operating an interlocking plant, are placed.

**INTERLOCKING SIGNALS.**—The fixed signals of an interlocking plant.

**HOME SIGNAL.**—A fixed signal located at the point at which the trains are required to stop when the route is not clear.

**DISTANT SIGNAL.**—A fixed signal of distinctive character used in connection with a home signal to regulate the approach thereto.

**DWARF SIGNAL.**—A low fixed signal.

#### The Requisites of Installation are

1. The interlocking of signals with switches, locks, railroad crossings or drawbridges, so that a clear signal cannot be given unless the route to be used is clear and stop signals displayed for all conflicting routes.
2. Levers, or their equivalent, located at a common point, by which switches, locks and signals are operated in a predetermined order, and through which switches, locks, railroad crossings, drawbridges and signals are interlocked.
3. Signals of prescribed form, the indications given by two positions, and in addition at night by lights of prescribed color.

switches or drawbridge cannot be opened after the train has passed the distant signal.

15. The interconnection of interlocking and block signals if both are used at the same point.

#### Adjuncts.

The following may be used if desired:

- (A) Distant signals.
- (B) Diverging switches for railroad crossings, drawbridges, junctions, and in sidings connected with the running tracks. Normal position—Open.
- (C) Repeaters or audible signals to indicate the position of signals to the signalmen operating them.
- (D) Annunciators for indicating the approach of a train, or for other purposes.
- (E) Route indicators.
- (F) Torpedo placers.

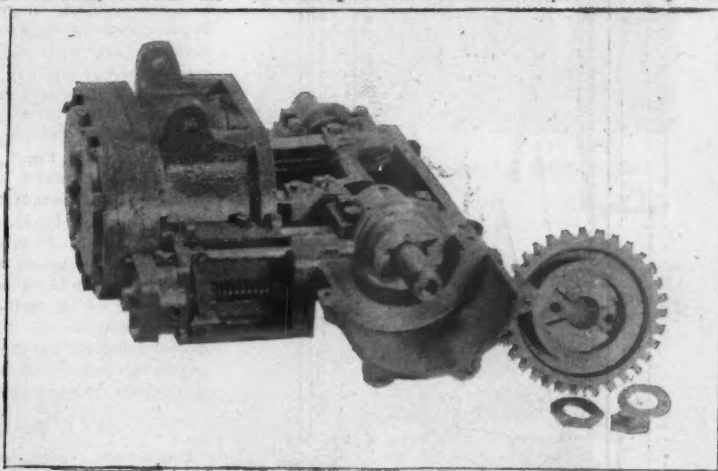
#### The Howe Air-Brake for Electric Cars,

The air-brake which is described here was designed especially to meet the needs of electric street car service, but is equally applicable to cable service and to other services running single cars or very short trains. The apparatus and system were designed and patented by Mr. H. L. Howe, who has had a good deal of experience with air-brakes and has been for a number of years especially concerned in their design. This brake has been in actual service for some months on electric cars,

head, are easy of access, and the clearance is reduced to the minimum.

On one end of the crank shaft a gear runs loose and is meshed with others, connecting it with the gear on the axle. One face of the hub of the loose gear is one member of a positive clutch. Sliding on feathers on the crank shaft, a collar carries the other member of the clutch and is normally held engaged by a spring. This collar has on its circumference a cam, which works in connection with the governing device. When this clutch is engaged power is transmitted to the pump from the axle.

The main feature of the governor is a cylinder in which is a piston, exposed on one side to direct reservoir pressure. A spring opposes this pressure on the other side. When the reservoir pressure moves the piston the motion is transmitted to a rod carrying a roller which



Air Pump and Governor with Cover off—Howe Brake.



may be thrust forward in front of the cam on the clutch collar, so that a partial revolution of the crank shaft will, by carrying the cam against this roller, slide the collar and disengage the clutch, thus disconnecting the pump. This is the special automatic governor.

Another opening in the governor cylinder, on the same side as the spring, communicates with the reservoir and is controlled by a valve, which valve is for simplicity, the same as that which works the brake, and the operating handle when moved to put on the brake actuates the governor by admitting pressure to the the spring side of the piston, which balances that on the other side, and permits the spring to withdraw the roller from the cam, allowing the clutch to engage. Thus when the car is being stopped the pump is working, being put in operation by the same movement of the valve handle which applies the brake.

When this handle is returned to the middle position, pressure is held in the brake cylinder and exhausted from the spring side of the governor piston, and the direct reservoir pressure acting against the governor piston stops the pump at the pressure at which it is set. The operating valve is so arranged that while the pump may be independently started and stopped the brake cannot be applied without starting the pump. It is evident that this positive starting of the pump will not only take power when the car is to be stopped, but also when there is no live power propelling the car, and the power so taken is stored for future use in applying brakes, and restores that used in the stop. Further, the pump is in action while the car is stopping.

The cam is so set that the pump will be disengaged when the crank reaches the center, and at this point the compressed air in the clearance of the cylinders will throw the crank ahead so as to take up the slack in the clutch and permit its disengagement at the moment when no work is being done by it. When again engaged there must be a partial revolution of the crank shaft before any strain will come on the parts, which assures a reliable action of the clutch.

The operating valve is designed to conform as closely as possible to the movements in hand-braking. A pull

return to the middle position will reduce the pressure and hold the remainder. The motorman quickly becomes expert and can graduate the pressure to a finer degree than can possibly be done by hand, while the advantage of having the full power always ready for an emergency has no parallel in the hand-brake.

The principal points claimed are positive action of the pump at the time of applying the brake, assuring a full supply of air; running the pump from the axle after the live power has been shut off; protection of all parts from dust and wear; simplicity of the governor and direct action of the clutch.

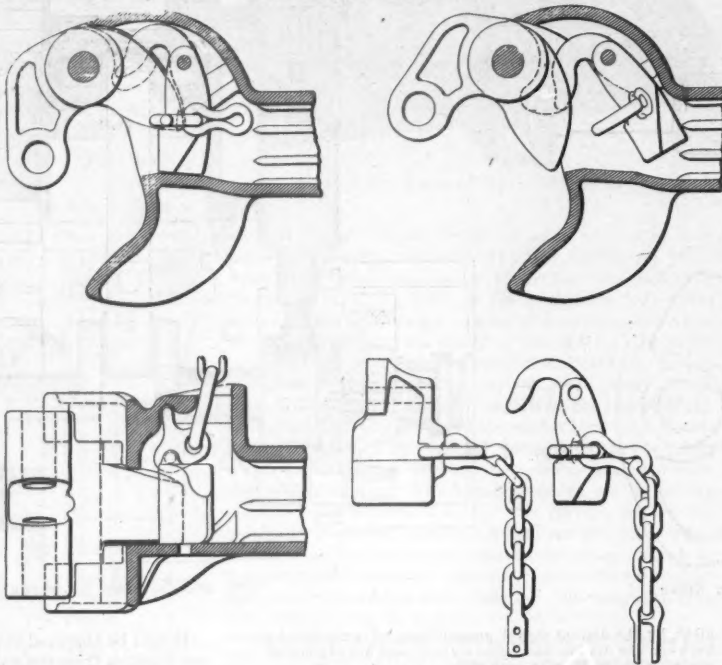


Fig. 1.—Tool for Grinding Locomotive Links at the Topeka Shops.

of the handle brings it to "on," which opens the valve from the reservoir to the brake cylinder. The return of the handle to "hold" closes the valve and holds the pressure in the brake cylinder. A push of the handle to "off" opens the exhaust and releases the brake. A pull of the handle will put pressure on the brake, more or less, according to the time the handle may be held; and if too much pressure is applied a quick push and

The Erie Coupler.

The special features of this apparatus are covered by patents Nos. 567,393 and 567,476. Mr. Howe may be addressed at Canandaigua, N. Y.

#### The Erie Coupler.

The engravings show the details of the locking and opening device of the Erie coupler, made by the Erie Malleable Iron Co., Limited, of Erie, Pa. The makers claim for this coupler that it will positively couple by either slow or fast impact, and many tests show that it never fails to couple on a 37-degree curve. The knuckle can be opened by moving the working lever, making it unnecessary to go between the cars. The principal feature claimed is that the coupler cannot become unlocked in transit. This company has in the past 10 years made many thousand couplers for other concerns, and the Erie coupler is the result of its observation on those couplers, and is offered now after over a year of practical service tests.

#### Tool for Grinding Locomotive Links.

An ingenious and at the same time useful and simple tool is the device for grinding locomotive links at the Topeka shops of the Atchison, Topeka & Santa Fé Railroad. It is shown in the accompanying illustrations and consists of a grinder attached to one of the posts of the machine shop about 36 in. above the floor, together with a sliding carrier in which the upper end of the radius rod is pivoted. The carrier is adjusted by means of the vertical screw A, Fig. 1, and the radius rod is adjustable in length by means of a clamp at the upper end of the carrier to suit the radius of the link to be grooved. The radius rod is a 1 1/2-in. gas pipe, the lower end being shown in Fig. 2. In this socket, Fig. 2, is held the link chuck, Fig. 3, to which the link is attached by bolts passing through the holes for the eccentric rod pins. The radius rod of the grinder having been adjusted to the right length to suit the radius of link, the grinder is moved laterally by the screw B, Fig. 1 and the link swung against it. By this means the correct curve is given to the slot in the link.

#### How to Manage a Freight Station.\*

One cannot expect good results from employees unless they feel a certain sense of security in their various positions. When changes are found necessary promotion should be made from the ranks if possible.

The agent should not be confined to detail work, but should be free to radiate where he thinks duty calls, although he should be equipped to assume any position if necessary so that employees may know he is familiar with every detail. When possible the out-bound and inbound work should be run separately, one set of clerks on outbound business and another set on inbound. The man in charge of outbound work should check tissue copy of billing against loading slips for any errors that may have been made and correction issued if necessary before tissues are sent to the auditor's office. This man should also handle corrections received on billing in order that he may be acquainted with the work of his men and thus reduce errors to a minimum. Each outbound shipment should be given a consecutive number in order that the tracing clerk can quickly locate same. This can be easily done by carrying a consecutive number on bill desk and numbering loading slips when brought from warehouse. The city loading

\* A paper by J. E. Youse, General Agent of the Columbus, Hocking Valley & Toledo, at Wellston, O., read before the Association of Officers and Junction Agents of the road.

slips should be pasted in consecutive number order in a stub filing book. The transfers from connecting lines should be treated likewise, being filed in a separate book for each line by foreign consecutive number. This overcomes the tiresome and frequently unavailing search for original loading slip or transfers and fully repays the labor necessary.

The inbound men should make expense and transfer slips and revise the billing, making corrections on same when necessary before the way-bills leave their desk and note on each way-bill handled by them their initials. Thus the responsibility can be easily placed in future controversies.

I am decidedly opposed to the street expense bill and insist on carbon copies not only as labor-saving but to insure accuracy in drawing off each item. In a certain office the inbound men were making three copies of city business and four when for connections. This was overcome by the auditor furnishing special form of expense bill and making the extra copies by use of carbon paper. Correction sheets should be consecutively numbered and of course an impression taken. All transfers and way-bills for connections should be itemized in a book and the receipt giving date and hour taken for same and thus prevent any question arising in the future as to a delay of a shipment on account of "no bill."

The claim desk demands a man well versed in the duties of each desk and while his duties are mostly mechanical he should be thorough and not make it necessary for the claim department to return claims for information which should have been given before the claim was forwarded. A record of all claims handled should be kept, giving date each claim was received and when and where forwarded. This department should also handle tracers, keeping an impression copy of traces forwarded and giving them a consecutive number. A notation should also be made on billing referring to number of tracer. Good results are obtained by pasting the returned original tracer or correction sheet in the impression book, where it was originally copied, and they are easily located when desired for future reference.

When practicable the bookkeeper and report clerk should be made subordinate to the cashier, as their work is connected with that department, and the men in line for promotion to the cashier's desk. The statistical clerk should be a reliable all-round man, as a great deal of such work as comparative statements of earnings, interchange of tonnage with foreign lines, etc., is valuable and having no direct check on its accuracy, such a position commands fair remuneration, which is necessary to secure the desired service.

I think it desirable to leave to the agent's judgment the question as to salaries for the various men and not always confine a fixed salary to a specified desk. It may be thought best in necessary changes to advance the salary of a certain clerk without changing his work, and while the aggregate could be checked and the maximum not exceeded, better results are sometimes obtained by starting a new man in at a smaller salary than probably the position demands.

The warehouse demands a foreman in charge who is active, of considerable executive ability. He should be supreme in employing and handling the warehousemen, as he is the one to whom you look for results, especially as to overtime, and should be able to map out his work so the little golden minutes should not be wasted.

In large terminals it is desirable to have the outbound and inbound houses separate, otherwise freight coming from connections in mixed car lots will necessarily be delayed, as the track room is always limited and city freight will and should be given preference. I am not an admirer of the blank tally system in unloading merchandise, and, while open to conviction, believe that better results are obtained by having an unloading slip made on the inbound desk as previously referred to. The foreman can then readily locate the various shipments, know of their importance and be prepared to handle accordingly. The over-and-short clerk should be under the direction of the warehouse foreman, and his duties become a part of that department, and I think it good policy to locate him in the foreman's office, where he is in close touch with the checkman.

The yard is not always a thing of beauty nor a joy at any time, and if the agent is to be held responsible for its griefs he then should also have absolute control of its head—the yardmaster. It appears to be the policy of some managing officers to make the agent nominally the head, but the yardmaster does not so consider it and the

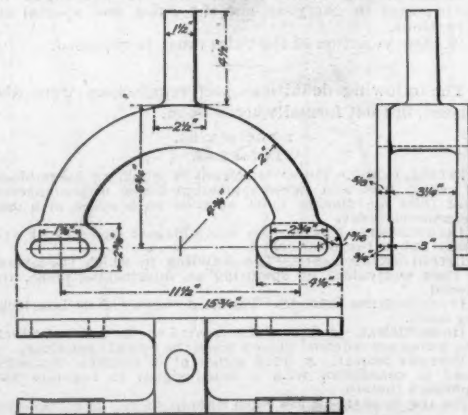
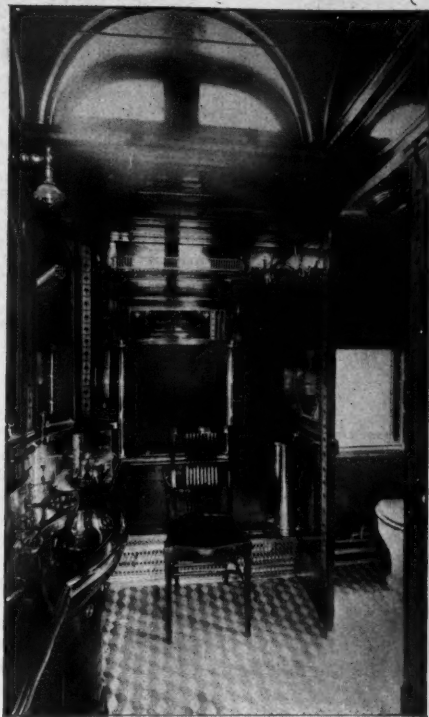


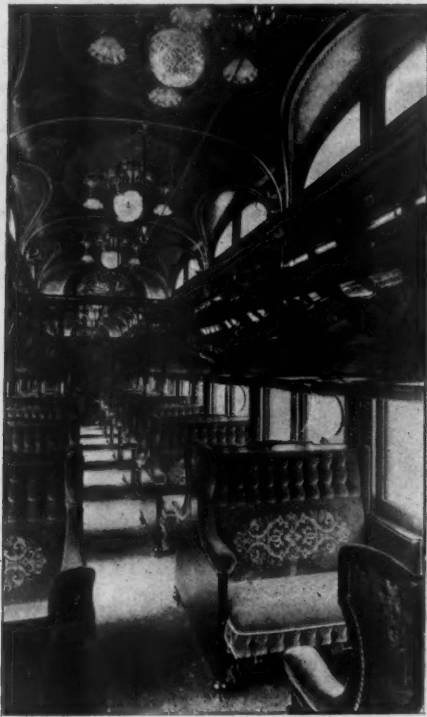
Fig. 3.—Link Chuck of Grinding Tool.

result is a clash. In such cases better far that the superintendent take the responsibility and the agent merely request his work done and make formal complaint when not complied with. I believe the agent should be in a position to fulfill any promise made to a shipper as to placing cars, etc., and not depend on the pleasure of the yardman. To accomplish the results the yardmaster should report direct to the agent who should

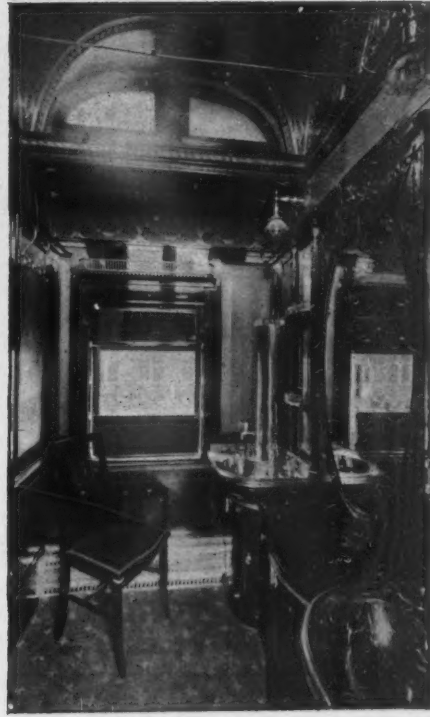




Toilet Room for Men in Sleeping Car.



Sleeping Car.



Toilet Room for Women in Sleeping Car.



Drawing Room in Compartment Sleeping Car.



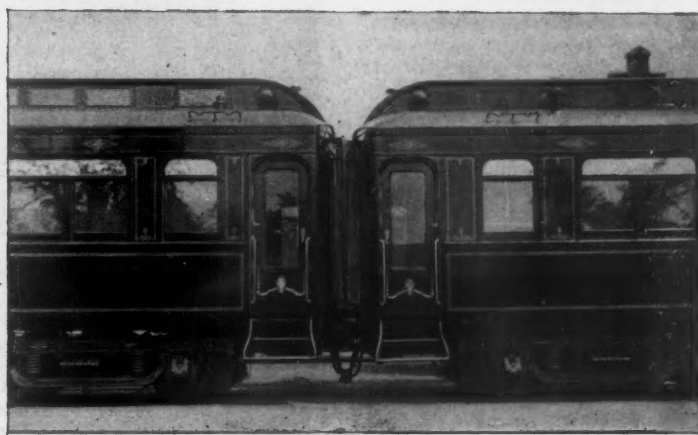
Chair Car.



State Room in Compartment Sleeping Car.



Smoking Room.



Wide Vestibule on all Cars.

INTERIOR VIEWS OF VARIOUS CARS OF THE NEW CHICAGO, BURLINGTON & QUINCY TRAIN.







of course, leave the detail work to the yardmaster. Their work should harmonize so nicely that the agent will not ask nor except any service but what can be readily accomplished.

When practicable bills and transfers for cars giving the connections should be delivered with the cars. When not practicable the bills should be delivered to the connecting line before the cars are, and such a rule should be imperative on cars received from connections. This overcomes that source of much annoyance—the "no bill" loads. It is well to furnish and demand a switching ticket for all cars going to private sidings, insuring a check to be kept on the switching charge account and enabling the yard man to find destination of cars promptly. It seems imperative that Sunday work be performed and I have found that it is frequently used as a clean-up day. I know this to be a mistake, as employees are entitled to a Sunday off when possible. By organizing the office force into squads, it being understood that each squad would be detailed alternately to Sunday work, the men know what Sunday they are free to join their family.

#### The "Bury" Locomotive.

Among the many various types of engines on the "Grand British Experimental Railway," as the Liverpool & Manchester has been aptly termed, was a solitary one called after the extinct bird from which the town of Liverpool takes its name. The Liver was built in Liverpool in 1832, by Edward Bury, of the Clarence Foundry, and was the third engine he made. It was, however, the twenty-sixth acquired by the railroad, all its predecessors except two being by R. Stephenson & Co., of Newcastle. In the Liver, Mr. Bury struck out a design, which, in after years, became very famous, though not a single feature of it has been preserved in modern English locomotive practice.

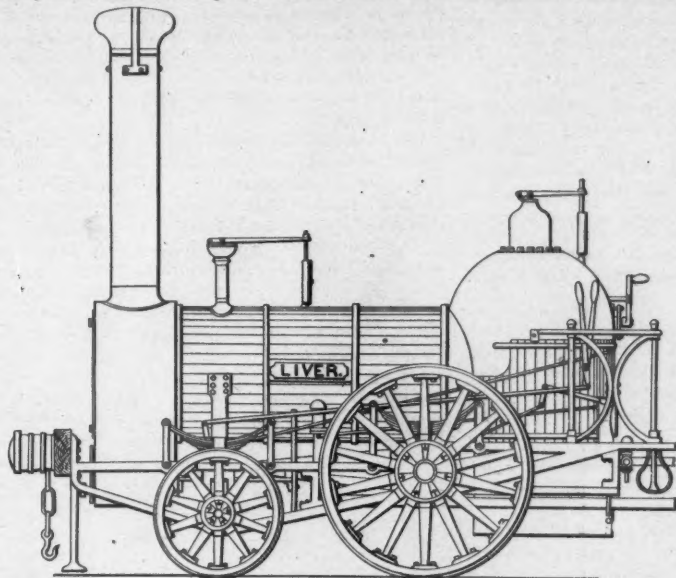
Taking up the bar framing, used in the Rocket in 1829, but soon abandoned by the Stephensons, he immensely improved it, and was certainly the first here to render it a mechanical success and suitable for high speed engines. Its various members were forged and welded together, the general principle being to substitute two long bearings between the wheels of each axle for the four or five short bearings generally employed. The frames were bent inward just behind the smokebox in order to get closer to the cylinders, upon which were lugs or projections which could be riveted down to the frames. A couple of straps passed across, below the cylinders, helping to support them and to unite the frames. Thus the attachment of the cylinders to the frames, though not perfect, was much better than the usual custom of fastening them in the base of the smokebox, and securing the latter to the frames by angle irons placed considerably higher than the line of stress.

As a result of being held close to their work, instead of having most of the weight outside the wheels, Bury's crank-axes broke less frequently than usual. This was certainly not due to their mode of construction, for they were forged in two halves and welded together, at right angles in the middle. The best Backbarrow iron was used, the cranks being cut out of the solid. Cases were recorded of the engines running some distance with broken or nearly broken axles, though one would not care to enquire too closely into them, even if it were now possible to do so.

Another special peculiarity of the Bury engine was its semi-circular firebox, the outer one rising to a hemi-spherical dome. This domed portion was always covered with copper or brass and kept bright, as well as a much smaller dome, carrying a safety valve, which surmounted it. The inner box had a slightly domed, or

was often redhot, and the cylinders sometimes cracked. A passage was purposely left round them so that the surplus heat might keep them hot. Bury arranged his tubes in arcs of circles, each row, measuring horizontally, rising so that the central tubes were higher than those at the sides. The idea was to prevent the side ones getting uncovered if the engine lurched on taking a curve. Brass, No. 14 B. W. G. thick, was the material of the tubes.

The most striking feature, perhaps, of Bury's engines was the remarkable construction of the wheels. Solid, round spokes, carefully turned, were screwed into a large cast-iron boss, having recesses in which a nut fitted upon the end of each spoke. At the outer end the



The "Liver"—Built by Edward Bury for the Liverpool & Manchester, 1832.

spokes were T shaped and attached by two rivets to the rim. The spokes radiated alternately from the inner and outer sides of the broad boss or center, a system employed by many makers with engine wheels of various forms, 60 years ago. It led to considerable vibration and shake in the wheels and had to be given up, though it held its ground for a good many years.

Although the Liver was Bury's first "single" engine, the peculiar features of its design originated with his No. 2, the Liverpool, built in 1831 for the Petersburg Railroad, in America. That was also a four-wheeler, but coupled. The general dimensions of the Liver were:

Cylinders.....	11 x 16 in.
Diameter of leading wheels.....	3 ft.
"    driving    "    .....	5 ft.
Wheel base.....	5 ft.
Length over buffers.....	16 ft.
Boiler.....	8 ft. x 6 ft. 6 in.
Center of boiler above rails.....	4 ft. 10 in.
Top of frame above rails, in front.....	2 ft. 9 in.
"    "    at back.....	3 ft. 3 in.
Length of dome casing.....	4 ft.
"    firebox casing.....	3 ft. 4 in.
Height to top of funnel.....	13 ft. 6 in.
Weight full.....	About 9 tons (of 2,240 lbs.)

The heating surface, taking the 97 tubes as 6 ft. 10 in. long and 2 in. diameter, would be 299 sq. ft., while the firebox had about 35 sq. ft. more.

The cylinders of both classes were, some 12 x 18 in., others 13 x 18 in., with from 86 to 90 tubes, giving from 375 to 400 sq. ft. of heating surface, while the firebox had about 40 ft. more. When in running order the smallest passenger engines weighed 9 tons 17 cwt., the goods 2 tons more. Of these weights, five tons 17½ cwt. and six tons 13 cwt., respectively, rested on the driving wheels. They differed from the Liver in having a lock-up safety valve on the boiler, instead of a spring balance one; 60 lbs. was the maximum pressure obtainable. The reversing gear was on the right hand side, not the left; there were four eccentrics, two for each direction, which could be thrown off pins or studs on the driving axle by means of a long handle

moving them sideways along it. When all four eccentrics were off the studs and out of gear, the valves could still be worked by two levers attached to them, the driver taking one in each hand and moving them alternately to and fro. It was usual to do this at starting, or in shunting. These levers or handles, of course, moved backward and forward whenever the engine was running with steam on, if either set of eccentrics was in gear.

In 1839, the Birmingham engines consumed 38.3 lbs. of best coke per mile, the goods engines 42.1 lbs., which is a good deal for the small loads they could take. Repairs came to 2.53 pence per mile.

Being too small for the traffic and quite unsuited for the increasing speeds, it was resolved, on the dissolution of the London & Birmingham Company in 1846, to

adopt larger engines on six wheels, but Bury's firm (then Bury, Curtis & Kennedy) refusing to fall in with this, their connection with the line abruptly ceased. Although they afterward built six-wheelers, and even an eight-wheeler, to order, they stuck to the four-wheeler engine whenever they could. But its day was over, and theirs too, for the firm was sold up in 1851, and Bury engines are now scarce indeed.

The Furness Railway, a local system in Cumberland and North Lancashire, still has a few Bury's, built in 1846, shunting at Barrow docks. These are of the later and larger type, with 4 ft. 9 in. wheels, cylinders 14 x 24 in., with the valves on the top, and weigh about 20 tons, full. They have their original four-wheeler tenders, but the smokebox and funnel have probably been somewhat altered.

The photograph is kindly furnished by Mr. F. Moore, of 9 South place, Finsbury, London, E. C., and the line drawing is a copy of Bury's own drawing of Liver No. 3, built for the London & Manchester Railway, 1832. It was No. 26 of the London & Manchester Railway list. Diameter of leading wheels, 3 ft.; driving wheels, 5 ft.; cylinders 11 x 16 in.; weight, full, 9 tons.

The Petersburg Railroad Company has in its shareholders' room a framed original drawing of the Liverpool, made from Bury's own working drawing, now at Chicago.

W. B. PALEY.

CHELSEA, LONDON, S. W.

#### The Slide Rule as an Aid to Railroad Field Work.

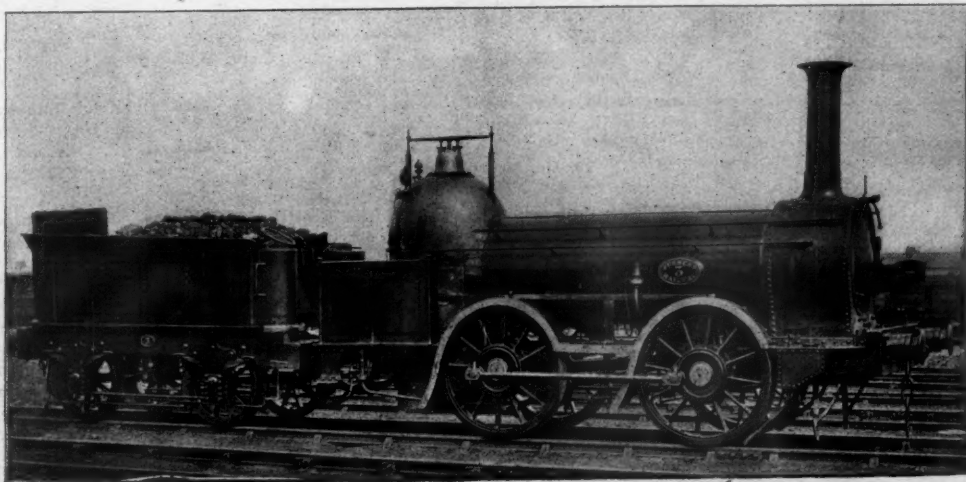
BY GEORGE DUNCAN SNYDER.

Assoc. M. Am. Soc. of C. E., City Engineer, Williamsport, Pa.

(Concluded from Page 314.)

To Substitute for a Curve Already Located One Having Transition Curves at the Ends, and Deviating from the Original Curve as Little as Possible.—This is the problem that most often occurs in fitting transition curves to an established line. The best way to accomplish this is to obtain a curve that will touch the original curve at its middle point, and terminate in tangents parallel to and inside of the original tangents a distance equal to the offset of transition curve. In other words, we must obtain a curve whose external secant is less than that of the original curve by an amount equal to  $a$ , Fig. 28. To effect this a trial offset is first assumed, or calculated from an assumed length of transition curve for the degree of the original curve. The distance  $a$  is then obtained by dividing the offset by the sine of the complement of half the intersection angle on the slide rule. The external secant for the original curve is then obtained, and  $a$  is subtracted from it. The result will be the external secant of the new curve, from which the new degree of curve can be obtained. A new length or offset is then calculated, and the apex distances of both curves are calculated, and their difference will give the distance ahead of the old P. C. to place the new.

Example.—Given a 7 deg. 30 min. curve for 44 deg. 22 min. Length of transition curves to be 300 ft. Set 7.5 on B under 1,375 on A; over 300 on D will be found 4.92 = the trial offset;  $\frac{1}{2} I = 22$  deg. = 11 min., the complement



Bury Locomotive of 1846—Running on the Furness Railway.

rather dished crown and was not stayed at all, except where it was flat, in front. Sixty pounds was Bury's maximum pressure for many years, but failure of the firebox was not uncommon with it. Contrary to the usual English practice, the inner box was of iron, with plates  $\frac{1}{2}$  in. thick, tube-plate  $\frac{1}{4}$  in. This was chiefly for the sake of lightness. The plates were welded at the joint, but so that the weld was not exposed to the direct action of the fire.

Yorkshire iron  $\frac{1}{4}$  inch thick was employed for the boiler, which in the engines of 1837-40 generally contained 86 tubes, 8 ft. 4 in. long and  $2\frac{1}{4}$  in. in external diameter. As might be supposed, such large tubes with a short run caused much waste of heat, the smokebox

Bury sent nine out of his first 16 engines, built to the end of 1834, to America, and two or three of the earliest French lines tried them; but getting the contract to supply power to the London & Birmingham Railway, in 1837, first really brought his engines into notice. Until it became the London & North Western, in 1846, no others were used, many, however, being built by other firms to his drawings. The whole stock, in 1846, consisted of engines virtually the same as the Liverpool and the Liver of 1831 and 1832, and but little larger. The passenger engines had mostly 5 ft. 6 in. drivers, but some only 5 ft.; the goods were some 5 ft., others 4 ft. 6 in. It was not unusual to employ goods engines in passenger service, the coupling-rods being taken down for the occa-



of which is 67 deg. 49 min. Set 67 deg. 49 min. on scale of sines under 4.92; over the index will be found 5.33, which is the amount the external secant must be shortened.

To obtain external secant,  $R = 765$ ,  $\frac{1}{2} I = 22$  deg. 11 min.,  $\frac{1}{2} I = 11$  deg. 05½ min. Set index on scale of tangents over 765, move runner to 22 deg. 11 min., move index to runner; under 11 deg., 5½ min. will be found 61.3, the external secant.

61.3 - 5.3 = 56.0 = new external secant.

Set 11 deg. 5½ min. over 56, move runner to index, set 22 deg. 11 min. to runner; under index will be found 699, which is the radius of an 8-deg. 12-min. curve. Unless great precision is required an 8 deg. 10 min. or an 8 deg. 15 min. would be found to answer as well. A new offset must now be obtained for the new degree of curve. Considering it an 8-deg. 12-min. curve, set 8.2 on  $B$  under 1,375 on  $A$ , over 300 on  $D$  will be found 5.38 on  $B$ , the new offset. Using this offset the original curve would be thrown four or five-tenths at the middle. To avoid this the same calculation can be gone over again, and the external secant reduced four or five-tenths more; or the same offset as before can be used, and the length of transition curve changed. Thus, with the rule set as before, under 4.92 will be found 287, the corresponding length.

To obtain the apex distances of the two curves, set the index of the scale of tangents over 765; under 22 deg. 11 min. will be found 312 = apex distance of 7 deg. 30 min.  $R$  of 8 deg. 12 min. = 698.9.

698.9 + 5.4 = 704.3

Set index of scale of tangents over 704; under 22 deg. 11 min. will be found 287.5 = apex distance of 8 deg. 12 min.

312 - 287.5 = 24.5

By measuring 24.5 ft. ahead of the old P. C. the position of the new one will be found, and by measuring one-half  $L$  back of this, the point of transition curve will be found.

**To Run a Transition Curve with Angles.**—The angle consumed by a transition curve is equal to the angle consumed by the simple curve between the P. C. and the end of transition curve, so it is equal to half the length of transition curve expressed in stations, multiplied by the degree of curve.

The angle  $ABC$ , Fig. 24, is one-half of the angle  $BAC$  and one-third the total angle  $DCA$  or  $EFA$ . The intermediate angles from the tangent to the points  $a$ ,  $b$ ,  $c$ ,  $d$ , etc., increase as the square of the distance, and they can be obtained on the slide rule as follows: Under one third the total angle of the transition curve on  $A$  set the number of stations on the transition curve on  $C$ . Then over any station number on  $C$  will be found the corresponding deflection on  $A$ .

Example.—Degree of curve = 6,  $L = 300$ ; to find deflection angles to points on transition curve. Here the half length of transition curve is 150 and the angle consumed is 9 deg. One-third of this is 3 deg. = 180 min. Suppose points are desired 50 ft. apart; this will make six stations on the transition curve. Set 6 on  $C$  under 180 on  $A$ ; then the other points will be found as follows:

Over 1 on  $C$  will be found on  $A$ , 5 = 0 deg. 05 min. = 1st deflection.  
Over 2 on  $C$  will be found on  $A$ , 20 = 0 deg., 20 min. = 2d deflection.  
Over 3 on  $C$  will be found on  $A$ , 45 = 0 deg., 45 min. = 3d deflection.  
Over 4 on  $C$  will be found on  $A$ , 80 = 1 deg., 20 min. = 4th deflection.  
Over 5 on  $C$  will be found on  $A$ , 125 = 2 deg., 05 min. = 5th deflection.  
Over 6 on  $C$  will be found on  $A$ , 180 = 3 deg., as before.

To run the curve on the ground, the instrument would be placed over the point  $B$ , and the above angles and their respective distances measured off until the point  $A$  is reached, when the instrument would be moved there and backsight taken on  $B$ , and then twice the last angle turned off, 6 deg. in this case, when the instrument would point tangent to the transition and simple curves. The main curve would be continued from this point as simple curves are usually run.

In running the transition curve from the main curve toward the tangent, the deflections are first obtained as though the main curve were continued to the end of transition curve, and from these deflections those obtained before must be subtracted. Suppose the instrument at the point  $A$ , Fig. 24, to point in the direction of tangent, with the vernier set at zero; then the deflections to the points on the transition curve would be as follows:

1st deflection.	Deg.	Min.	Deg.	Min.	Deg.	Min.
1st	3	00	0	05	2	55
2d	4	30	0	20	3	40
3d	6	45	0	45	3	15
4th	7	30	1	20	4	40
5th	8	15	2	05	5	25
6th	9	00	3	00	6	00

After having set these points the instrument would be moved to the point  $B$ , and a backsight taken on  $A$ , when 3 deg. would be turned, and the instrument would point in the direction of the tangent.

**To Connect the Two Arcs of a Compound Curve with a Transition Curve.**—In this case the formula remains the same as before, but the difference between the degrees of the two curves must be used for  $D$  in the formula. The offsets are obtained the same as for a simple curve, and are measured toward the inside of the flatter arc, and toward the outside of the sharper arc; see Fig. 25.

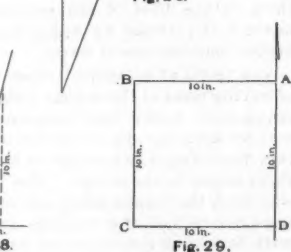
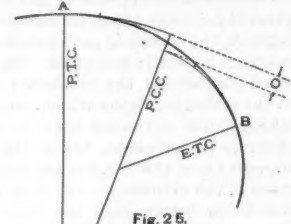
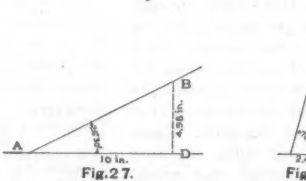
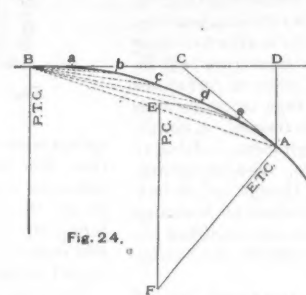
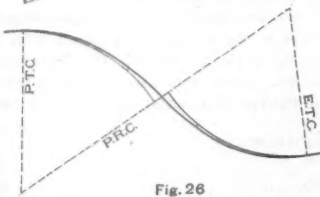
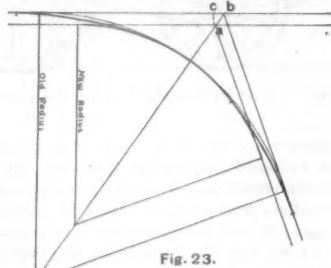
Example.—Given a 1-deg. curve compounding into an 8-deg. curve, length of transition curve 250 ft. Here  $D = 8$  deg. - 1 deg. = 7 deg. Set 7 on  $B$  under 1,375 on  $A$ ; over 250 on  $D$  will be 3.18 on  $B$ . If points are desired 25 ft. apart, there would be five points on each half

length of transition curve. Set 5 = 125 on  $B$  under 1.59 on  $A$ ; then

Over 1 on  $C$  will be found 0.013 = 1st offset.  
" 2 " " " " 0.10 = 2d " "  
" 3 " " " " 0.34 = 3d " "  
" 4 " " " " 0.81 = 4th " "  
" 5 " " " " 1.59 = as before.

In staking out the above curve, deflections for the 1 deg. curve for points 25 ft. apart would be turned off, and the stakes would be moved over from these points the above offsets. When the P. C. C. is reached, a point is set 1.59 from the 1 deg. curve, which marks the position of the transition curve at that point, and another is set 3.18 from the 1 deg. curve. The instrument is then set over this point and sighted parallel to the tangent of the 1 deg. curve at that point, and deflections for points 25 ft. apart on an 8 deg. curve are turned off, and stakes set over by an amount equal to the same offsets as used before, measured in the opposite direction, until the end of the transition curve is reached, from which point the main curve can be continued without moving the instrument from the P. C. C.

To run the above curve by means of angles instead of offsets, the method of procedure would be as follows: The angles are obtained as for a transition curve connecting a tangent and a simple curve, using a rate of curvature equal to the difference in the degree of curve of the two curves. These angles must then be added to the corresponding deflections of the flatter curve, if running from the flatter curve to the sharper, and subtracted from the corresponding deflection of the sharper curve if running from the sharper curve to the flatter. In this case we have a 1 deg. curve compounding into an 8 deg. curve, with a transition curve 250 ft. long. To find the angles, we have 7 deg.  $\times$  1.25 = 8.75 deg. = 8 deg. 45 min. 8 deg. 45 min. + 3 = 2 deg. 55 min. = deflection for last point. The intermediates are obtained on the slide rule, as described before. The deflections for points 25 ft. apart on the 1 deg. curve are then obtained.



The Slide-Rule as an Aid to Railroad Field Work.

and the transition curves added to them, which gives the proper deflections, as shown below.

1 = 0 deg. 07½ min. + 0 deg. 01¼ min. = 0 deg. 09¼ min.	
2 = 0 " 15 " " 0 " 07 " " = 0 " 22 " "	
3 = 0 " 22½ " " 0 " 16 " " = 0 " 38½ " "	
4 = 0 " 30 " " 0 " 28 " " = 0 " 58 " "	
5 = 0 " 37½ " " 0 " 44 " " = 1 " 21½ " "	
6 = 0 " 45 " " 1 " 03 " " = 1 " 48 " "	
7 = 0 " 52½ " " 1 " 26 " " = 2 " 18½ " "	
8 = 1 " 00 " " 1 " 52 " " = 2 " 52 " "	
9 = 1 " 07½ " " 2 " 22 " " = 3 " 29½ " "	
10 = 1 " 15 " " 2 " 55 " " = 4 " 10 " "	

The total angle of a transition curve connecting the two arcs of a compound curve is equal to the sum of the half length of transition curve multiplied by the degree of curve of each arc. In this case it would be  $(1.25 \times 8) + (1.25 \times 1) = 11.25$  deg. = 11 deg. 15 min. From this subtract the last deflection 4 deg. 10 min. and we obtain 7 deg. 5 min., the amount that must be turned off with the instrument at the end of transition and a backsight on the point of transition curve to bring the instrument to tangent.

In running the curve from the 8-deg. curve toward the 1-deg. curve, the same transition curve deflections as obtained before must be subtracted from the deflections for an 8-deg. curve, as shown below. With the instrument on the end of the transition curve and a backsight on the point of transition, a deflection of 4 deg. 10 min. will bring the instrument to tangent, and this added to 7 deg. 05 min. gives 11 deg. 15 min., as before.

1 = 1 deg. 00 min. - 0 deg. 02 min. = 0 deg. 58 min.	
2 = 2 " 10 " " 0 " 07 " " = 1 " 53 " "	
3 = 3 " 20 " " 0 " 16 " " = 2 " 44 " "	
4 = 4 " 30 " " 0 " 28 " " = 3 " 32 " "	
5 = 5 " 40 " " 0 " 44 " " = 4 " 16 " "	
6 = 6 " 50 " " 1 " 03 " " = 5 " 47 " "	
7 = 7 " 00 " " 1 " 26 " " = 6 " 34 " "	
8 = 8 " 10 " " 1 " 52 " " = 7 " 08 " "	
9 = 9 " 20 " " 2 " 22 " " = 7 " 38 " "	
10 = 10 " 30 " " 2 " 55 " " = 8 " 05 " "	

**To Connect the Two Portions of a Reverse Curve with a Transition Curve.**—Reverse curves rarely exist on a line of any importance, but as they frequently occur on branches in rough country, and are used around yards, the problem is given.

This method of procedure is the same as in the former cases, only for the  $D$  in the formula, the sum of the degrees of curvature of the two arcs is used; see Fig. 26. Example: An 8-deg. curve reverses into a 7-deg. curve with an offset of 10.2 ft. Here  $D = 8$  deg. + 7 deg. = 15 deg. Set 15 on  $B$  under 1875 on  $A$ ; under 10.2 on  $B$

will be found 306, the length of transition curve. The method of obtaining the intermediate offsets and staking out the curve is the same as in the preceding cases.

The great advantage of the above method of running transition curves is its great flexibility. No complicated tables are required restricting one to a certain number of curves of fixed offset and length; but all the necessary data for any length or offset of any degree of curve can be obtained in few minutes on the slide rule, by a simple setting that can readily be memorized.

With a proper system of transition curves like the preceding, little or no additional work is required on the location of a line. As Mr. A. M. Wellington states in his "Railway Location," the transition curve need not be run, but merely provided for by the introduction of the main offsets, the setting of the intermediates being postponed until ready for track-laying. For grading purposes, it will generally be sufficient to set a stake at the P. C. by bisecting the offset, or if the curve is long, the quarter points of the transition curve can be set by offsets from the curve to the main offset.

#### MISCELLANEOUS SETTINGS.

The following are a few settings that will be found useful in practice.

**Diameter and Circumference of the Circle.**—The ratio of the diameter to the circumference of the circle, 1:3.14159, is marked on scales  $A$  and  $B$  of most rules by an additional line. To find diameters and circumferences, set this additional line on  $B$  under the index of  $A$ ; then diameters will be found on  $A$  over circumferences on  $B$ . Thus over 4 will be found 1.275, under 2.1 will be found 6.50, etc.

**Diameters and Areas of Circles.**—This can be most readily obtained by using the formula,  $\text{Area} = \frac{\pi d^2}{4} = 0.7854d^2$ . Most slide rules have the constant .7854 marked

on the right side of scale  $B$ . Set .7854 under the right index of  $A$ ; then over diameters on  $D$  will be found areas on  $B$ . Thus over 3 will be found 7.05; over 4 will be found 12.57, etc.

To find areas with circumferences given, set 12.57 on  $B$  under the left index of  $A$ ; then over circumference on  $C$  will be found areas on  $A$ .

The above settings are very useful in finding areas of round bridge members, and in finding the capacity of water and sewer pipes.

To find tons of rail per mile of track, set 7 on scale  $B$ , under 11 on scale  $A$ ; then over pounds per yard on  $B$  will be found gross tons per mile on  $A$ . Thus over 56 will be found 88; over 70 will be 110; over 100 will be found 157, etc.

**To Find Acres in Right of Way.**—To find the number of acres in a piece of right of way of uniform width, set 43,560, the square foot in an acre, on  $C$  over the width on  $D$ ; then under the length in feet on  $C$  will be found the number of acres on  $D$ . Thus for a width of 60 ft. set 43,560 over 60; then a strip 1,400 ft. long would have 1.93 acres in it, and a piece 261 ft. long, .360 acre, etc. The position of the decimal point can readily be found by inspection. Thus, it can be seen at a glance at the rule that it would take a strip 736 ft. long to make an acre, so that all lengths between 736 and 7,260 would have a result between one acre and 10 acres, and all lengths between 73.6 and 726 would have results between .1 acre and 1 acre.

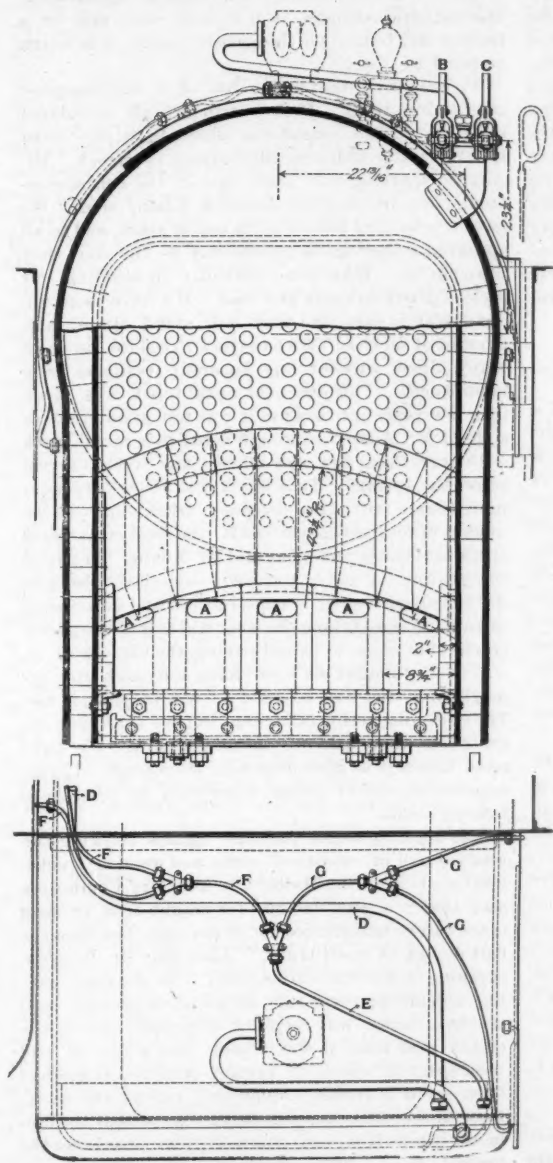
**Latitudes and Departures.**—These can be roughly obtained on the slide rule, as follows: Set the index of scale of sines under the distance; then over the course will be found the departure, and over the complement of the course will be found the latitude.

Example.—What is the latitude and departure of a course of N. 56 deg. 30 min. E. for a distance of 520 ft.? Set index under 520; over 56 deg. 30 min. will be found 434, the Easting, and over 33 deg. 30 min. will be found 287, the Northing. By marking the numbers on the scale of sines from right to left, as well as from left to right, the necessity of subtracting the angles from 90 deg. to obtain the complement will be avoided, as over the course on one set of numbers will be found the departure, and over the other the latitude. It is often necessary to plot the line of a



railroad on a very small scale, say from 2,000 ft. : 1 in. to 5,000 ft. : 1 in. The best way of doing this is by latitudes and departures, and they can be very quickly obtained on the slide rule, and more accurately than they can be plotted on such a scale.

**Plotting and Turning Angles.**—Very accurate work can be done by plotting and turning angles with the slide rule. To turn an angle set the indices of the scale of tangents to coincide with those of scale *D*. Then the tangent of any angle between 5 deg. 43 min. and 45 deg. will be found on scale *D*. Measure off 10 in. along the line from which the angle is to be turned, and erect a perpendicular; then on this line, scale off the tangent of the angle as indicated on scale *D*. Then a line drawn between this point and the point on the base line from which the 10 in. was measured will diverge from the base by an amount equal to the given angle. Thus, to turn an angle of 26 deg. 30 min. From *A* on the line *A D*, Fig. 27, measure off 10 in., and erect a perpendicular. Under 26 deg. 30 min. will be found 498. Measure 4.98 in. along the perpendicular, and call the point *B*; then a line joining *A* and *B* will form an angle of 26 deg. 30 min. with the base.



The Marck Smoke Consumer on the Western Railroad of Austria.

To turn an angle of more than 45 deg., get on the rule the tangent of the complement of the angle, and measure this off along the base and erect a perpendicular at 10 in.; then a line from this perpendicular to the original will make the angle required. Thus, to turn an angle of 76 deg. 15 min. The complement of 76 deg. 15 min. is 13 deg. 45 min. Under 13 deg. 45 min. will be found 2.45. Then proceed as shown in Fig. 28.

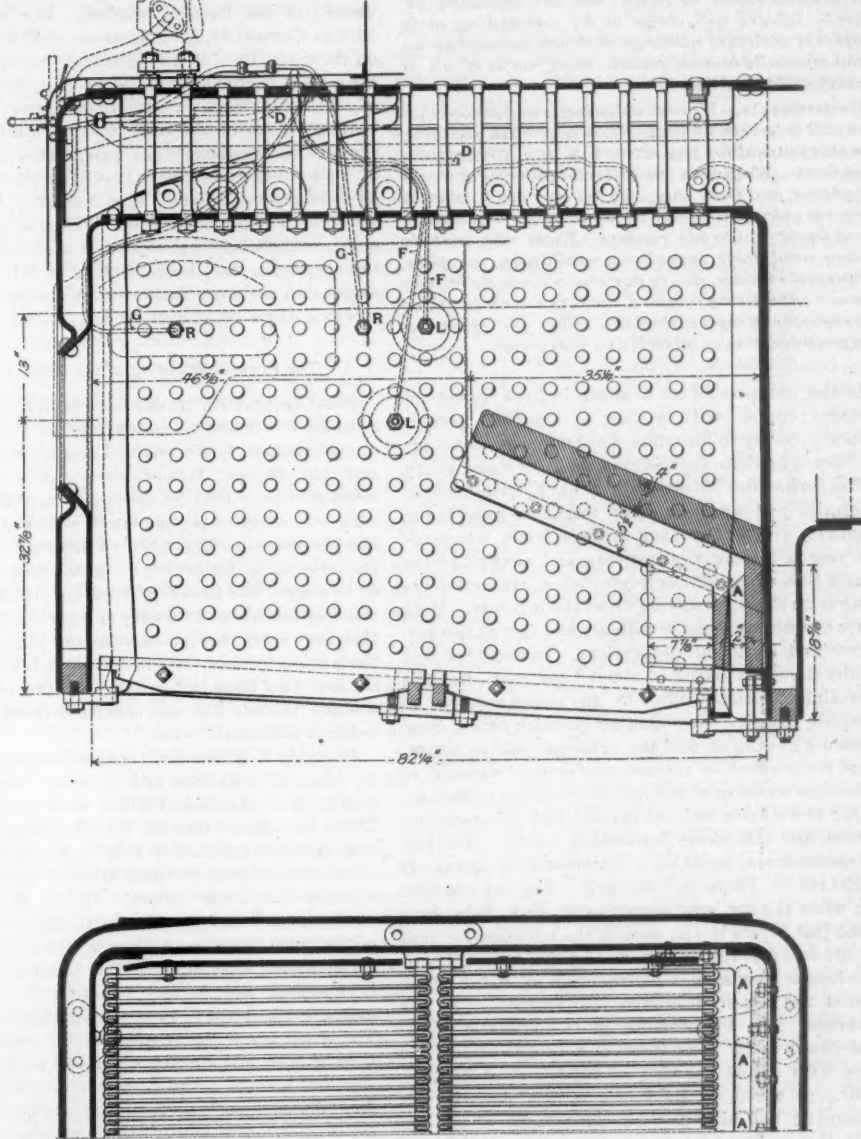
To obtain the tangents of angles of less than 5 deg. 43 min., set the left index of *C* over 1.745 on *D*, and the tangents of angles between 1 deg. and 5 deg. 43 min. will be found on *D* under the angle expressed decimally on *C*. Angles less than 1 deg. can be obtained by setting 60 over 1.745, and reading the angles expressed in minutes, or if expressed decimally, can be obtained as in the previous setting.

If the beveled edge of the rule is graduated in inches and decimals, another scale need not be employed to scale off these tangents.

When it is desired to prick off a number of the courses of a survey at one time, lay off from the meridians a square of 10 in., as shown in Fig. 29. Then for N. W. or S. E. courses, using *D* as a center, scale off the tangent of the angles from *A* toward *B* up to 45 deg., and above 45 deg. scale the tangent of the complement of the angle from *C* toward *B*, and for a N. E. or S. W. course, using *C* as a center, scale off the tangents of the angles up to 45 deg. from *B* to *A*, and over 45 deg. scale the tangent of the complement of the angles from *D* toward *A*.

#### Smoke Prevention in Austria.

The Marek apparatus for the prevention of smoke, as applied to Austrian engines, is shown in the accompanying figures. As will be seen, it is a combination of the old steam-jet idea with hollow bricks having flues through them for heating the air, which is then admitted over the fire. In front of the firebox, bricks with openings *A A* through them are placed. The air in passing through these openings is heated by contact with the bricks, and passes out of the upper end under the ordinary brick arch at a high temperature, and ready to complete the combustion of the imperfectly consumed carbon, which has come from the fire in the shape of carbon monoxide, especially when fresh coal has been put on. In order to assist the complete mixture of the highly heated air and the combustible gases, steam jets are arranged on opposite sides of the firebox as shown at *R R* and *L L*. These jets are placed irregularly with the object of creating circular or whirling currents in the firebox to more thoroughly mix the gases. They are supplied by pipes *F F* and *G G* which branch from a single pipe *E* leading from the valve *C*.



The Marck Smoke Consumer on the Western Railroad of Austria.

The valve *B*, conveniently located by *C*, is the blower valve, *DD* being the blower pipe.

The working of this apparatus, so far as the prevention of smoke is concerned, is highly satisfactory. A trial of this was made, and when in use no smoke could be seen issuing from the stack, even when fresh coal was put in. The difference when the valve was closed, and the steam jets thus cut off, was striking, as clouds of black smoke immediately poured from the stack. This seems to show that merely heating the air, by passing it through the hollow bricks is not sufficient to prevent smoke, but it must also be thoroughly mixed with the gases by the steam jets. No economy in coal consumption is claimed for this consumer. In fact, it is probable that if there is any difference, a trifle more coal is burned with it than without it on account of the steam used for the jets. The inventor is Mr. Marek, Locomotive Inspector of the Western Railroad of Austria.

#### Foreign Railroad Notes.

Siam is to have a railroad from Bangkok to Pet'aur, and the whole capital required has been subscribed by Siamese subjects. Work must be begun Feb. 1.

In 1896 870 miles of new railroad were opened in the German Empire against 1,037 miles in 1895. The new road was all in short sections, the longest only 43 miles.

In France at the close of 1896 there were 25,573 miles of railroad in operation, 2,519 miles of which were classed as "local railroads." There were besides 1,515 miles of street railroad.

Negotiations long pending for the purchase of the chief private railroad of Belgium, the Belgium Grand Central, seem substantially closed, and soon, doubtless, that road will be added to the state system, leaving no important private railroad in the country. Belgium has long been considered as the classic country of the "mixed" system.

The Austrian Minister of Railroads has issued a circular announcing that beginning with next year freight traffic on Sunday and eight other holidays will be restricted on all Austrian railroads in accordance with certain rules, the first of which says that it will be done so far as possible without providing new construction on additional rolling-stock, which is a very important limitation.

The Hungarian State Railroads earned gross in 1896

10 per cent. more than in 1895, while their working expenses increased 6½ per cent. The net earnings were about 4 per cent. on the capital invested.

The Prussian State Railroads have begun trials on a large scale of beech ties, that wood apparently having heretofore been regarded as unfit for such use. Contracts have been made for 80,000 such ties, to be preserved, planed, bored and provided with two 5-in. screw-bolts each, to prevent splitting. The contractors guarantee a life of 15 years for 50,000 of these ties, and of 10 years for the other 30,000, which are sold as second-class ties. They will be laid with considerable numbers together, so that their service may be readily observed and recorded.

The directors of the Orleans Railroad (France) have made provision for assisting employees whose salaries are 1,500 francs per year or less, and who have to support in their families more than three persons of the following classes: Children under 15; invalid children of any age; brothers, sisters, nephews or nieces less than 15 who are orphans or half-orphans; father, mother, father-in-law or mother-in-law. The company contributes five francs a month for every one of such persons exceeding three on the hands of the 1,500-franc employee. Whether an American railroadman could be tempted to have his mother-in-law live with him by an addition of a dollar a month to his income seems doubtful.





ESTABLISHED IN APRIL, 1856.

Published Every Friday.

At 32 Park Place, New York.

## EDITORIAL ANNOUNCEMENTS.

**Contributions.**—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies in their management, particulars as to the business of the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and railroads, and suggestions as to its improvement. Discussions of subjects pertaining to ALL DEPARTMENTS of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.

**Advertisements.**—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. We give in our editorial columns OUR OWN opinions, and those only, and in our news columns present only such matter as we consider interesting, and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers, can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.

Adding compressed air to steam in the cylinders of a steam engine with a view to securing greater economy, owing to the reduced cylinder condensation, has been a favorite engineering topic for many years, and experimental investigations have been made to determine just what economy might be expected in practice. One of the latest of these trials was made last year at the Stevens Institute and showed pretty clearly that when all the circumstances are considered there is no saving resulting from the mixture. Four series of tests were made with air at different temperatures and in various proportions. In these the best results showed a saving of about 7 per cent., but this was almost exactly offset by the power required to compress the air. Now another question arises, compressed air being used as the principal motive power, what is the effect of introducing a small amount of either hot water or steam into the working cylinders? So far as we know but one careful test has been recorded, and this shows interesting results. The test in question was made on a compressed air motor car at Fabrik St. Fargeau, Germany. The car was first run when the air was heated to 32 degs. Fahr. by a flame just before it was used in the cylinders, so that the air was practically dry, and second, when the air was heated by means of an injection of water which heated the air to the same temperature as in the first case. The temperature of the exhaust in the first case was 32 degs. Fahr. and in the second 122 degs. Fahr., thus showing a difference of 90 degs. Fahr., or about 22 B. T. U. in the exhaust air. When the hot air was used, the weight of air per I. H. P. per hour in the cylinders was 45.53 lbs., while in the other case it was 33.59 lbs. The total efficiency with the hot air was 64.8 per cent., while with the hot water injection it was 86.9 per cent. If other similar tests have been made, it would be of interest to know what results were obtained.

The gross earnings of our railroads showed a slight improvement in April (1.44 per cent.), as compared with the same month of 1896, and an inspection of the May earnings, so far as they are yet collected, indicates a further gain. But for the four months ending April 30 there was a loss of \$1,292,162 compared with the first third of 1896. On the other hand the English railroads continue in their exuberant prosperity. For the first four months of the year their gross receipts show an increase of more than three-quarters of a million sterling over the figures for 1896, which themselves were a great advance on the figures for 1895. Of the £750,000 increase, roughly two-thirds is from freight and the remainder from passenger traffic. The truth is that business in England is exceedingly brisk, and the railroad receipts only tell the same tale of prosperity as the Exchequer receipts, the figures of foreign trade, and the Board of Trade returns as to unemployed in the staple industries. There are parts of the country, Birmingham and South Staffordshire,

for instance, and also, perhaps, Glasgow and the Clyde, where to find a *bona fide* workman out of work is a practical impossibility. A somewhat amusing illustration of this position was given in the House of Commons a few days ago; a member who is, what is very rare there, an avowed Protectionist, asked the President of the Board of Trade whether he was aware that a new London underground railroad, the Waterloo & City electric line, which is just being finished, had ordered its rolling stock from America, and whether he would take any steps to prevent English railroads employing foreign labor in future. The President of the Board of Trade in his reply, after disclaiming sympathy with the point of view of his interrogator, went on to state that the only reason why the order had been placed in America was that, though seven leading English firms had been applied to, not one was able to undertake to execute the order within the required time. One result of the increase in railroad earnings is the unprecedented price to which stocks have advanced in the London market. For instance, the Illinois Central 3½, first mortgage gold bonds, secured on the main line of an excellent railroad property, are quoted there at 104; the 2½ per cent. debentures of the Great Western (English) stand at 100. The ordinary stock of the Lake Shore & Michigan Southern, paying regularly 6 per cent., but with a prospect of a rise in the immediate future as the result of the new conversion scheme, stands at 168; the ordinary stock of the London & South Western, paying 6½ per cent., with at best a prospect of slow and fractional improvement, has been dealt in at 227. And as far as one can see now, there is every prospect of English stocks going a great deal higher.

## The Present Standing of the Steel Truck.

Metal freight car trucks have been a subject of a good deal of interest the last year or two, to makers of steel shapes, to mechanical engineers and to a few railroad officers. Indeed, among men of inventive mind and men looking about for new fields the design of a successful steel truck is looked on as one of the big prizes still possible in railroad engineering. It is true that this interest began more than a year or two ago. The first Fox truck for American service was finished about February or March, 1891, and since that time each year has brought out other trucks; but the number of new designs has probably been greater the last year than in the five years preceding. These designs include not only complete trucks, but steel bolsters and small parts.

Probably it is true that trucks of metal will take the place of composite trucks, with bolsters, spring-planks and transoms of wood, or of wood and metal. There are many reasons for this conclusion. The best diamond truck with wooden transverse members is necessarily weak in those attachments which serve to keep the truck square. This is a very serious weakness and increases fast with age. The shrinking of the wood alone, regardless of wear and decay, will make these vital connections difficult to maintain. It is possible and, in fact, common, to make the all-metal truck simpler, thus saving time in inspection. The metal truck can be made stiffer, especially in the bolster, and yet lighter than the composite truck. The best known pressed steel truck weighs 1,300 to 2,000 lbs. less per car than the diamond trucks in common use, and has one-third as many parts. This point, of the stiff bolster, has been brought up and proved and discussed so often that it is like flogging a dead horse to talk of it now, but we will venture to call attention to the words of the Master Car-Builders' committee of 1893: "Your committee tested the largest and average size [of oak bolsters not trussed]. . . . The deflection under a load of 40,000 lbs. plus the car body [for both bolsters] showed that none of them had any factor of safety whatever and allow free curving of the truck"; and further, "many freely stated that they found more defects in bolsters of freight trucks than in any other item about the truck." But, as a matter of fact, they might about as well have included the trussed bolsters which they tested. The best of these deflected ¼ inch under 25,000 lbs. and the combination bolster (two plates built in) deflected ⅞ in. Most of the trussed bolsters took a permanent set with that load. Of course, such bolsters are bound to let the car down on the side bearings after carrying a few loads of the full weight; and probably the majority of freight cars running are in a chronic state of going down solid on the side bearings when loaded to their marked capacity. But no engineer ought to think of designing a steel bolster that would not carry 50,000 lbs. with ¼ in. deflection and 150,000 before taking any permanent set.

These elements—lightness, stiffness and squareness

—are earning money every mile that the truck makes on the road. It would be quite hopeless to attempt to compute their economical value to the railroads in reduced cost of hauling trains. We knew an engineer of ability and inventiveness who patented a contrivance designed to make the rear truck track accurately after the front one. He calculated that the saving in resistance, following the diminution of flange friction, would cut down the cost of operating railroads by an enormous sum. In fact, he proposed to make contracts to work railroads, taking as his profit a percentage of the saving of coal and water. The weakness of his scheme was that the device did not work; the one car to which it was applied promptly went into the ditch. But he had the germ of a good idea. There are millions, for the railroads at any rate, if not for the inventor, in keeping trucks square, letting them curve freely, and cutting down their weight a ton or two for every freight car hauled. To these advantages of the metal truck we may add at least three others, longer life, less cost for repairs and finally, neater and more mechanical appearance. The aesthetic element is not very important in a freight car; but, other things being equal, it is worth considering.

We can set no limit to the life of a well-designed steel or iron truck. If the parts are all calculated not to be worked beyond the elastic limit, they must be practically indestructible except by wreck. Mr. Adams, speaking five years ago of the continuous-frame, iron truck of the Boston & Albany, said: "We have trucks that have been in use 30 years, and to all appearance they are as good to-day as the day they were put up. There is no difficulty in building our style of truck to carry any load. We have them under 60,000-lb. cars, and they will stand almost any amount of service. We have had 75,000 lbs. on them many times without any apparent weakness being manifested." This excellent metal truck was given up a few years ago because it was too good, and in spite of Mr. Adams' thorough belief in a metal truck with everything but the wheels and axles carried above the springs. That truck cost about \$60 per car more than a fairly good diamond truck, and yet the officers of the road considered it "the most economical truck that can be run"; but said Mr. Adams "we run 10 foreign cars for one of our own—somebody else gets the benefit of that good construction and diminished repairs. We are taking the wear and tear of the poorer trucks that come to us and paying the expense of it, . . . so we thought we were doing too much for our neighbors," and they adopted a truck in general use. The reasoning seems fallacious, but we shall not digress into that field of discussion now. We have cited this case as good evidence, from a man of great experience, and of actual experience in what he is talking about.

It is not easy to get definite figures showing the relative cost of repairs of metal and wooden trucks. Four years ago the Master Car Builders' Committee said that "a good design of wrought iron or steel truck can be maintained for 18 per cent. less than the best design of wood truck." Last year Mr. Higgins, speaking at the convention, said: "On one road, having several thousand cars mounted on pressed steel trucks a record was kept for 12 months and at the end of that time it was found that where \$1 had been spent in repairs of pressed steel trucks \$10 had been spent in repairs to diamond trucks, the conditions of service being the same except that the diamond trucks had been running three years and the pressed steel trucks one year." The difference between these two statements is broad enough one would say to cover the whole range. Probably the committee's estimate was intentionally very guarded; but we will suggest one possible reason for the difference of opinion. Much the largest part of truck repairs is to the wearing details, which are standards, and which are not greatly affected by the type of truck. If we include these, the difference in the totals may perhaps be as small as 18 per cent., but we should doubt it. If, on the other hand, we compare the repairs to truck frames alone they may be as ten to one. This branch of the subject we need not follow further, now, but probably by this year considerable accurate information is accumulated and perhaps some of it will be drawn out at the conventions.

We said at the outset that many engineers and steel makers regard the design and building of steel trucks, and certain special principal truck members, as one of the fertile fields in railroad supplies. Doubtless this is correct, there is a good deal of money to be made in the supply of these articles, the market for which is great, and it seems bound to open up soon. But it does not seem as if there is any reason to expect large sales at fancy prices. To begin with, the old diamond truck with wooden bolster and spring plank has developed into a pretty service-



able institution, and it will no doubt be improved in some details and it is at least good enough to keep prices of metal trucks down. Then, further, there can be no monopoly, or anything approaching it, of good steel trucks and bolsters. There are too many ingenious engineers and enterprising makers of steel shapes and steel structures. Consequently we judge that the makers of such trucks and parts must expect to be content with only fair manufacturers' prices if they are going to sell their wares extensively. Possibly the greatest reason why steel trucks are not in wider use even now is that buyers have thought the prices higher than they really ought to be.

#### Judge Brewer's Decision.

We have received the full text of the decision of the Supreme Court (that the Interstate Commerce Commission has no power to prescribe railroad rates), which was briefly reported last week, and its essential points will be found on another page of this issue. Mr. Justice Brewer has made a powerful argument. He sticks closely to the one point, that the power to declare a rate unreasonable at this moment does not imply the power to do anything with respect to rates to-morrow. The Interstate Commerce Commissioners desire the power, in declaring a rate unreasonable, to say to what degree it is unreasonable; that is, to say what rate is reasonable. Justice Brewer does not deny this; in fact, he keeps clear of this question; but whatever else the Commission may say or do about the charges or the doings of the railroads, it cannot lay down a tariff for them and say that it shall be observed for any definite time, not even a single day. The Commission, in fact, is in just the same position as that occupied by the Massachusetts Commission; it can utter its opinions but cannot enforce them. This, indeed, has been the case all along, but Justice Brewer practically says in addition that, as regards the future, it must not try to enforce its views.

This, as we intimated last week, narrows the present decision down to an order to the Commission not to bother the courts with applications which they are sure to deny. The courts will continue to entertain petitions to enforce the opinions of the Commission as regards actual railroad transactions, but will not, without more explicit legislation, entertain petitions to prescribe rates for transactions yet to take place. We do not see but that the Commission, in declaring a certain rate unreasonable, still has the authority to express its views as fully about the future as about the past, provided the facts of the future can be clearly discerned; but it will be a waste of time to ask the Courts to order an enforcement as to the future.

To illustrate the point, take the New York milk-rate case, recently decided. The Commission declared certain rates too high, and ordered the substitution of certain lower rates in place of them. Under Justice Brewer's decision, a court would sustain the Commission's opinion (if found to be reasonable) as regards specific shipments of milk, but would not enforce an order of the Commission as regards milk rates for to-morrow, or next month. If, after obeying the court's order to refund overcharges on certain milk bills, a railroad should go on charging the higher rate the aggrieved shipper would have to make a new complaint. It is to be borne in mind that whenever, in the past ten years, railroads have obeyed orders of the Commission without the intervention of the courts it has been because they believed that the courts would hold the order reasonable. The milk-rate case is, no doubt, one of this kind.

The counsel for the commission tried to make out that the Supreme Court in the Social Circle case (162 U. S., 184), had said by implication that the commission could fix rates provided it had fully investigated the facts. Justice Brewer's answer to this is not very strong, but whatever the court may have almost said then, it unequivocally says here that it is vicious to argue that because an administrative body can declare a certain reduction of rates reasonable now, it can order such reduction continued indefinitely into the future; it would be building up indirectly and by implication a power which is not in terms granted.

As this decision does not deny the power of the Commission to declare the degree of unreasonableness that it finds in rates now or heretofore in force, it is not exactly true to say that the Commissioners, in attempting to reduce rates, must proceed inch by inch. Moreover, it would be an exceedingly obstinate railroad which, in making a reduction in compliance with a judicial decision, should not make it large enough to remove the liability of new suits against it, at least for a moderate length of time. In the case now adjudicated, for example, the Commission can say that the rate from Cincinnati to Chattanooga on goods coming

from Chicago is, say, 25 per cent. higher than it ought to be. Then a consignee, or a thousand consignees, can sue for overcharge, and, assuming that the Commission's view is just, the Court will decide the overcharge suit against the road. A sufficient number of such suits would induce the road to reduce its tariffs. This brings the whole matter back to where it was before the Interstate Commerce Commission was established, except that now consignees have the Commission to help them prepare their cases; and that is where it should be.

Justice Brewer does not strengthen his argument by his catalogue of things that the Commission can do, for one of these is to see that there is no discrimination between shippers or cities, and a complaint of such discrimination was the main feature of the suit which this decision settles. But this "concession" of the learned Justice is overruled, so to speak, by his more emphatic declaration that in all decisions the Commission must resolutely shut its eyes to the future.

It is to be hoped that this decision will be read by every editor and every legislator in the land. There will, of course, be numerous propositions to enlarge the powers of the Interstate Commerce Commission, and it will be a great gain if all such propositions can be considered carefully in the light of the weighty words of this decision. They should tend powerfully to enlighten those who think it is a light thing to give five men power to decide upon freight and passenger rates all over the country.

#### The Richmond Meeting.

The official report of the spring meeting of the American Railway Association, just issued, gives the revised rules for the first page of the Standard Code (Rules 1 to 12), which were adopted by the Association, and a list of requisites for the installation of interlocking apparatus, which was discussed but not adopted. We reprint both on another page.

The rules are a marked improvement on those which they replace, but they are very brief. From a statement made by the chairman of the committee in the meeting, it appears that the specific aim in revising these rules was to put them in as few words as possible, a course which must often weaken the force of many rules. A chief object of the Association code is uniformity among a large number of roads, and as many managers will desire to amplify these rules, the absence of fullness means a sacrifice of uniformity, for each manager will amplify in his own way.

If we were to criticise the definitions of and requisites for interlocking, we should repeat substantially what we said a year ago concerning the block-signal rules. Brevity and all-inclusiveness are hard things to combine. Moreover, the demand for original treatment, so-called, is not pressing. For a rational statement of signaling requisites one might do far worse than to go back to the work of Charles R. Johnson in 1889 (the Johnson catalogue). He probably gave little thought to the possible opinions that courts or jurymen might have concerning his terminology, and still less to the interests of some individual road which insisted on using apparatus different from that used by everybody else, but he made a clear, strong statement, and one hard to find fault with.

The discussion at the meeting touched but a few points. The committee succeeded in retaining the use of the simple term "cabin" in the third definition as against the less accurate "tower," and the meeting voted to expunge "railroad crossings" from the 11th requisite; but the clumsy term "diverging switch" (meaning derailing switch, or, in the vernacular, "derail"), as used in adjunct B and elsewhere, was not got rid of. The uselessness of the distinctions made by the committee between block signals and interlocking signals was apparent from some remarks made in the discussion, but was not considered at length.

The main feature of the discussion was an unsuccessful attempt by Mr. Loree, General Manager of the Pennsylvania Lines West of Pittsburgh, to get the 15th requisite stricken out and the 6th so changed as to make it say that signals govern tracks and not trains. His object was to leave the regulations in such shape that a road could use fixed signals while still continuing to run trains by telegraphic orders, such orders conveying instructions perhaps different from those conveyed by the signals. It is not clear from the printed report whether this proposition was rejected because the members present had determined views concerning it, or because they were in a hurry to adjourn the meeting and visit the Richmond Locomotive Works or the Newport News docks; but it seems likely that the principle for which Mr. Loree is

contending will be ultimately rejected, whatever the fortunes of the particular clauses which he is here dealing with.

His idea may be illustrated by the example of a train at the end of double track waiting to enter the single track. It has an order not to start until a certain hour or until the arrival of a certain train; but the signalman lowers the signal before the specified time or before the train arrives, and that act, if the signal "governs" the train, is an order for it to proceed and, of course, conflicts with the dispatcher's order. Mr. Loree would have the signal simply indicate to the engineer how the switch or track-route has been set. He complains that we have blindly followed the English in a custom that is adapted to their facilities and practices but not to ours; and asserts, moreover, that the Englishmen themselves would not have done as they have done, had not the Board of Trade forced them to adopt "the appliances of the inventors," meaning apparently that "the inventors" induced the Board of Trade to compel the railroads to adopt extensive and elaborate signal fixtures earlier than was necessary.

As we said, we do not know why Mr. Loree's proposition was voted down, but there is one strong reason why the opposition to it will be likely to be permanent, and that is that to have signals govern trains is an ideal plan, while the opposite proposition is temporary in its nature. Railroad officers as well as other people have a great liking for ideal plans, especially when it is only a matter of voting on a regulation that they are perfectly free the next day to disregard in practice.

Signal engineers all over the country (on the Pennsylvania, as well as other roads) are striving to promote the adoption of appliances and practices which shall make it practicable to govern trains wholly by fixed signals; and, while they admit that, with the present incomplete equipment of most railroads, their ideal must submit to modifications, they will probably want the modification made in some way other than that advocated by Mr. Loree.

Possibly the most rational way of meeting the difficulty in cases like that cited may be made clearer by recognizing that in adopting English signal appliances, we have omitted to adopt an important element of English practice, that of issuing orders to conductors and engineers through station agents. If Mr. Loree's signalman, supposed to have changed a signal so as to give an engineman wrong instructions, had himself been the intermediary through which all the orders to the engineman had been issued, where could he get any instructions or motives contrary to those actuating the engineman?

Requisite No. 15 embodies an important principle, and the language, as reported by the committee, certainly is loose enough to admit of almost any modification that any one could desire to make. To employ the space-interval principle in running trains, while ignoring the switches in the track over which the trains run, is a practice the weakness of which is universally admitted. Numerous railroads in this country tolerate this weakness, but we had not supposed but that all of them intended to do away with it as soon as they could. It is to be hoped that this 15th clause will be discussed and re-discussed until the important issue involved in it shall be thoroughly comprehended everywhere.

#### Cubic-Foot Rates for Bulky Freight.

The Chicago, Milwaukee & St. Paul has taken an important and practical measure looking to the abatement of the large-car evil; it has issued a tariff of rates by the cubic foot, by which bulky freight will be carried as cheaply in a small car as in a large one. Some other roads west of Chicago have, we believe, taken similar action. The construction of such a tariff is very simple and was described in the *Railroad Gazette* of Dec. 4 last by Mr. E. D. Sewall, Assistant General Freight Agent of the Chicago, Milwaukee & St. Paul, at Milwaukee. The tariff gives a list of the rates, in cents per cubic foot, to correspond with any carload rate (even dollars) from \$10 up to \$205. At \$10 a car the cubic foot rate is 0.263 cent; at \$38 a car it is just one cent; at \$100 a car 2.632 cents; at \$190 a car 5 cents, and so on. The tariff is accompanied by a list of the sizes of the box cars owned by the road; and there are no less than 29 different sizes, varying in cubic capacity from 1,265 ft. to 4,006 ft.

The tariff seems to be very liberal to the shipper. It does not apply to household goods, emigrant movables, live stock, saw dust and a few other things, but on all ordinary bulky freight it makes the same rates per cubic foot in any common box car that the tariff now prescribes for such freight in 46-ft. furniture cars.

A car of that length and 8 ft. 9 in. x 9 ft. 3 in. cross-section contains 3,723 cu. ft.; the minimum rate under the weight tariff for a carload of wooden ware from Chicago to St. Paul is \$37.50 (15,000 lbs. at 25 cents.), and the rate per cubic foot, where the carload rate is \$37.23 (approximately), is set down in the table as one cent.

\* The use of d-tector bars at crossings, as contemplated by the committee, is illustrated in the interlocking plant at De ton, Ill., described in the *Railroad Gazette* last week. The Illinois Railroad Commissioners require this.



Thus a lot of woodenware weighing 10,000 lbs., if of the same average weight per cubic foot, would fill a car of 2,482 cu. ft. capacity, say a 34-ft. car, and would be billed at \$24.82. To provide against unequal charges in case the woodenware were heavier than the average, it is provided that the freight charges, computed by feet, must not be less than would be charged on the freight if billed according to the actual weight at the carload rate in cents per 100 lbs. To take another example: on mattresses the minimum weight for a carload is 14,000 lbs., which from Chicago to St. Paul (at 25 cents) makes the rate for a carload \$35. Seven thousand pounds of mattresses of the same degree of bulkiness ought to figure out \$17.50; and on referring to the table we find that the foot rate set opposite to \$35 is 0.931 cent, which, divided into \$17.50, brings 1,900, or just about one-half the number of cubic feet in a 46 ft. car. If, therefore, the mattresses are put into a car of 1,900 cu. ft. capacity, they go for \$17.50. No bills are made except for full cars. The Chicago, Milwaukee & St. Paul tariff says that the cubic foot rate must not be used in billing to points on other roads.

The result of this step in the direction of an important improvement in railroad service will be watched for with interest by many superintendents and car-service officers.

The very general discussion of railroad rates since the decision of the Supreme Court in the Trans-Missouri Freight Association case has led many newspapers to give much more attention to the subject than ever before. It is to be hoped that this may result in the spread of real knowledge concerning this complicated subject. Among other unusual places where we find the subject treated is in the London letter of the *New York Mail and Express*, where, in a recent issue, over a column is given to the English rate situation. The writer's main facts are not new to the readers of the *Railroad Gazette*, but he gives considerable space to the matter of secret rate cutting, and one naturally queries whether he has not exaggerated the importance of it. Inquiring of traffic managers and others how it could be that competition was kept up while the railroads had their most important earnings pooled, he was informed about various interesting "dodges" resorted to by the "traffic solicitors." The most usual device, he says, is false classification. Another one, frequently used, is the prompt settlement of claims for loss and damage, without much regard to their reasonableness. Again, an agent makes himself solid with a shipper by promising, several weeks or months in advance, to secure a reduction of rates by all lines. Of course he is not sure to get the business for his own road, but if he is shrewd, and if the promise is fulfilled, he can make this a valuable means of ingratiating himself with a large shipper. But the most subtle scheme of all, says the correspondent, is that of making reductions on contracts to non-competitive points in return for the promise of a definite quantity of freight to competitive points. Probably all these devices are practised to a considerable extent in the United States. The most remarkable thing is that the Englishmen know of the cheating in classification and yet wink at it. In this country the railroads save thousands of dollars by preventing the success of this trick, the inspectors going to the extent of breaking open boxes every day. How many thousands of boxes there may be which ought to be opened but which are left undisturbed, we do not know. Possibly the English roads shut their eyes to irregularities for the same reason that some of our trunk lines keep quiet while their poorer competitors cut rates; because a defective pool, which works, is better than a perfect one which never gets started.

A new passenger tariff went into effect on the Belgian State Railroads May 1 last. One of its chief features is the abolition of the increased charge for express trains. Compared with the previous tariff, regular fares are unchanged for the third class, increased 12½ per cent. for the second class, and increased 25 per cent. for the first class. For international passengers—passengers ticketed through Belgium to some adjacent country—the old express rates are charged, and these are the same as the present regular rates for the first-class and slightly higher for the other classes. The new regular rates are 2.93, 1.98 and 1.17 cents per mile for the three classes, respectively; for round-trip tickets, 2.34, 1.58 and 0.94 cents. There are, however, many reduced rates, season tickets, etc., and for the lowest classes of these there is generally some reduction from the old fares. The lowest prices for a single ticket, however short the distance, are 50, 35 and 20 centimes, or 0.7, 0.79 and 3.88 cents. Workmen's season tickets are reduced 10 per cent.

The lower house of the French Parliament has voted to tax free passes—a policy which doubtless will be regarded as particularly brutal by the holders of such passes. The deputies meanly argue that the people who pay for their tickets have to pay taxes on them, a certain percentage being added to the companies' prices for the benefit of the Treasury—and that those who pay nothing for their fares can afford to pay the tax at least as well as those who do pay for tickets—utterly disregarding the rights of the privileged classes. They say that the French railroads give out yearly as many as 7,000,000 passes, or papers entitling the holders to less than regular rates, and that a pretty penny can be made by taxing them. They do not venture, however, to make the pass-holders pay as much as ticket-holders, but only

1, 2 and 4 cents per trip-pass for the three classes respectively, and 5, 10 and 20 cents for season passes. A beggarly \$190,000 is all that is hoped for from this act of oppression.

Mr. John W. Cloud, Secretary of both the Master Car Builders' and Master Mechanics' associations, is to be commended for the prompt appearance of the advance reports of the two associations. With the exception of a few reports, which were sent in late, advance copies were mailed on May 28 and 29, so that they were in the hands of the members from 10 days to two weeks previous to the convention at Old Point Comfort. The few reports which were delayed will be distributed at the meetings.

#### TRADE CATALOGUES.

*Schenectady Locomotives.*—The Schenectady Locomotive Works, Schenectady, N. Y., issues its catalogue under date of May, 1897. It is a handy volume of 224 pages octavo size, which size, by the way, is much more convenient for almost any man's shelves than the quarto size.

The Schenectady Works have an annual capacity of 450. Mr. W. D. Ellis is President and Treasurer, Mr. A. J. Pitkin, Vice-President and General Manager; Mr. A. P. Strong, Secretary; Mr. A. M. White, Superintendent, and Mr. J. E. Sague, Mechanical Engineer. A brief sketch of the history of these works was given in our personal columns last March, at the time of the death of the then President, Mr. Edward Ellis.

In this volume the first 201 pages are given up to illustrations and descriptions of characteristic locomotives, both simple and compound, and by the way, there is a very good alphabetical index of railroads, making it convenient to refer to any locomotive which one may wish to look for, knowing the railroad for which it was built. In 22 pages are given information and tables. One table gives tractive power by mean effective pressure, six tables give tractive power for boiler pressures from 150 to 200 lbs.; another table gives revolutions per mile, piston speeds at 10 miles an hour and speed factors for calculating tractive power at various piston speeds. Another table gives train resistance for various speeds and grades and still another the horse power to overcome train and grade resistances.

We are informed in the text that the resistances on the level have been arrived at from a comparison of figures obtained by dynamometer tests. In the Rogers catalogue the resistances are taken from Forney's Catechism, which gave the best information at the time when it was written, but that information has become antiquated in the light of later experience. We tabulate below the train resistances on a level at various speeds as taken from the Rogers table, the Schenectady table and from the article published in the *Railroad Gazette* May 21, giving the results of some recent and extensive French experiments. The resistances are in pounds per short ton. The Baldwin and Barnes resistances are scaled off from a small diagram:

Miles per h.	Rogers.	Schenectady.	Barbier.	Baldwin.	D. L. Barnes.
20.....	8.3	6.2	4.5	....	....
25.....	9.6	7.0	5.4	....	....
30.....	11.2	8.0	5.9	....	....
35.....	13.1	9.1	6.8	....	....
40.....	15.3	10.4	7.8	....	....
45.....	17.8	11.8	9.0	10.5	....
50.....	20.6	13.4	10.2	11.5	11
60.....	27.0	17.0	13.1	12.5	11.6
70.....	31.6	....	16.5	14.5	12

*Rogers Locomotives.*—The Rogers Locomotive Co., Paterson, N. J., has just issued its 1897 catalogue, which is a quarto volume of 121 pages, well bound and handsomely printed. The frontispiece is a portrait of Thomas Rogers, and there is an old engraving of the Rogers Locomotive Works as they appeared in 1832, and one showing the works in 1897. The Rogers works were established by Thomas Rogers in 1831. On his death, in 1856, they were reorganized under a charter with the title of the Rogers Locomotive & Machine Works, J. S. Rogers, the son of Thomas Rogers, being the President, which office he filled until 1893. From February, 1893, the works were continued under the name of the Rogers Locomotive Co., with Robert S. Hughes as President and Reuben Wells as Superintendent.

The blank forms used by the company for general descriptions and the standard specifications are given, and then follows a chapter of useful information concerning the elements which enter into ascertaining the tractive power of locomotives. One of the tables given shows the mean percentage of boiler pressure effective on the piston, with given driving-wheel diameters and speeds. The data of this table are also plotted in a diagram. Other tables show piston speed in feet per minute for various diameters of drivers and speeds in miles per hour. Other tables show the tractive force per pound of effective pressure, with given dimensions of cylinders and drivers. The bulk of the volume, of course, is taken up with engravings and descriptions of typical engines made by the company. A description of each engine includes not only the weights and dimensions ordinarily given, but a table of loads that the engine can haul at given speeds and on various grades.

*Westinghouse Engines.*—The Westinghouse Machine Co., Pittsburgh, Pa., sends us a catalogue of 49 pages showing the Westinghouse engines. A good deal of space is given up to illustrations, and especially pictures of actual installations, which give a notion of the great

variety of work to which this engine is applied. It hardly seems necessary to say anything in a notice like this about the Westinghouse engines. The makers state that every compound engine which they build is put through a complete economy test before it leaves the shops. All the "standards" and "juniors" (simple engines) are subject to a regular running test, and two engines taken at random from each shop order are tested for economy. The records of these tests are open for inspection, and further, any purchaser may have his engine tested at the Westinghouse shops by his own expert, and may accept or reject the engine from this test. Certainly nothing could be fairer than that. The pamphlet contains a few records of actual tests. The compound engine is built in 10 sizes, running from 85 H. P. at 100 lbs. pressure up to 740 at 150 lbs. pressure. The "standard" engine is built in 13 sizes from 5 H. P. up, and the "junior" in seven sizes.

*Nobrac.*—The Patterson-Sargent Co., of Cleveland, O., has issued a small pamphlet by this name. It is only 3 x 6 in., and contains but 39 pages, within which, however, some good sense can be found in regard to painting iron and steel. "Nobrac" is a brand of carbon paint, made of pure linseed oil and an inert pigment. It can be obtained in either black, brown or olive, and is for use either as a priming coat or any other. The pamphlet discusses the requirements of a paint for iron and steel surfaces. The subject is carefully treated with references to and quotations from recent literature which has appeared in the form of papers before a number of the engineering societies. This pamphlet is free from the extravagant statements often found in such publications.

*Rainbow Packing.*—An attractively arranged circular issued by the Peerless Rubber Manufacturing Co., 16 Warren street, New York, has just been received. The Hercules combination metallic packing, the "peerless" spiral piston and valve rod packing, the "honest John" hydraulic rainbow core packing, and the "eclipse" sectional rainbow gasket are briefly described, and the price per pound for each are given. The different styles of packing as mentioned above all contain the best material, and they are made with great care. This doubtless accounts for their durability, which is essential for packing subjected to wear.

*Steam Joint Grinder.*—Fraser & Bailey, 11 Broadway, New York City, have just issued an M. C. B. standard-size pamphlet, giving description and illustrations of the Economy steam joint grinding and milling machine, with directions for using it. This machine was described in our issue of June 14, 1895.

*Air Compressors.*—The new Catalogue, No. 9, of the Clayton Air Compressor Works, will be issued on or about June 10, and may be obtained on application at their offices, Havemeyer Building, 26 Cortlandt street, New York.

#### Municipal Ownership of Street Railroads in England.

BY W. M. ACWORTH.

*General Tramway Conditions.*—I understand that the question of the municipal ownership of street railroads—or, as they are always called here, tramways—is at present under discussion in America, and that English experience in the matter has been appealed to. It may therefore be interesting to readers of the *Railroad Gazette* to know what our experience really is. At the outset let me say that in my personal judgment the experience of England can be of but scant use as a guide to the United States. The conditions of the problem in the two countries are totally distinct. In the first place tramways are comparatively unimportant here. In the whole of Great Britain and Ireland, with a population of 40 millions, there are only about as many miles of tramway—say roughly a thousand miles—as in the state of Massachusetts. London, with nearly five million inhabitants, has a little over 100 miles of tram line. Syracuse, N. Y., with a fiftieth part of the population, has a few miles under the hundred. Not but what our tramways do carry a large number of passengers. They amounted to 760 millions in all last year, of which London alone accounted for about a third. But London tramways (and the same is true, though not quite to the same extent, of many other of our great cities), are kept outside the central and pleasure districts of the town altogether. A visitor may be in London for weeks without ever seeing a tramcar. My own personal experience is, I believe, fairly typical of that of other residents in the West End of London, and I think I should exaggerate if I said that I used a tramcar once in six months. There are two main reasons to account for this state of things: The first and principal that our towns are old, with narrow and crooked streets, laid out, many of them, not only before tramcars, but actually before wheeled vehicles of any kind had to be taken into consideration. The second reason lies in the fact that our railroad companies have from the beginning cultivated a suburban business which the density of the population has made commercially possible even with units as large and as costly as a railroad train.

Narrow and crowded streets have produced another effect. They have made the high speed and the trailers to which you are accustomed quite out of the question. Our maximum speed limit is eight miles



an hour; the actual distance covered in an hour is seldom, I think, more than five. Add to this an almost insuperable objection by English people to overhead electric wires—an objection based partly on æsthetic grounds, but more on the fear of accidents—and you have a sufficient explanation of the fact that, whereas nine-tenths of your street railroad mileage is operated by electricity; with us nine-tenths is still worked by horses, though it is fair to say that steps in the direction of working by mechanical power are now being taken in many important towns.

Let me add one more fact which to my mind dominates all commercial comparisons of rapid transit problems here and in the United States. The uniform fare, irrespective of distance, to which you are accustomed is apparently impossible here. For this reason, five cents is with you a recognized unit, and this is a sum at once low enough for the bulk of the population to pay without hesitation, and high enough as an average to give a satisfactory revenue to the tramway company. Here we have no such unit. Our people have long been accustomed to penny railroad tickets and penny, and even half-penny, omnibus rides. A uniform tramfare of two pence would probably drive half the passengers into railroad trains and omnibuses forthwith. At a uniform fare of a penny the tramway companies could not possibly live. Our tram fares, therefore, have to be based on distance, and I need not point out what a difference this makes in the settlement of suburban districts by an increasing population. London grows, not by steadily extending its borders in wider concentric circles, but rather by the formation of numerous smaller circles round centers, which are constituted by the local stations of the various trunk lines leading out of the metropolis. With which long but necessary preface let me come to my proper subject, namely, the municipal ownership of tramways.

**Proportion of Public Ownership.**—According to the official returns for the year ending June 30, 1896, there were in the United Kingdom 153 tramway undertakings. Of these 116 belonged to private companies and 37 to the local authorities—a proportion that is of roughly one-fourth. But the proportion of our tramways municipally owned is larger than would appear from the above figures, as the tramway systems owned by the municipalities comprise among them a good many of the most important in the country. This is shown both by the capital and by the mileage. The municipal tramways, for instance, have cost for construction alone £3,300,000, as compared with £8,400,000 for the companies' lines—a proportion, that is, of a good deal more than one-fourth—while they comprise 339 miles, as against 673—a proportion of roughly one-third of the total. Out of the 335 miles of municipal lines, moreover, 193 are double, whereas out of the 673, the miles of double line are only 265. If London, whose tramways are practically all non-municipal, were left out of account, the importance of an average municipal as compared with an average non-municipal tramway undertaking would be much more conspicuous.

**The Huddersfield Example.**—At this point let me stop and clear away what will otherwise be a source of serious misunderstanding. The figures just given refer to municipalities owning the lines within their boundaries. The working of these lines is, however, in almost every case leased to an operating company. Only one corporation, that of Huddersfield, a town with a population of about 100,000 persons, has had any lengthened experience of working its lines directly. Huddersfield has worked its tramways, which now have a total length of 22 miles, since August, 1882. In that time the gross receipts have amounted to £212,000, and the gross expenditure to £276,000, leaving a deficiency of £64,000, which has had to be made up out of the local rates, or, as you would call them, taxes. Whether the working of the tramways by the municipality in Huddersfield has been a success or not I will not pretend to say. That financial success has been obtained will hardly be argued in face of the figures I have given. It is fair, however, to say that the financial results have greatly improved recently. As lately as 1893 there was a deficiency of no less than £16,000, as the result of a year's working, which was met as to £8,000 by the proceeds of a rate of 5d. in the pound, as to £4,000 by a transfer from depreciation fund, and as to the remaining £4,000 in a way that I have not been able to trace. For the year ending March, 1894, the deficiency fell to £7,300; in the following year it dropped to £2,400 and the next year to £2,000. For the year ending March 31, 1897, the income more than covered the expenditure, though an unusually heavy outlay was incurred in relaying a considerable stretch of line and charged to revenue. Nor does it seem as though the technical ability of management had been exceptionally conspicuous. In 1883 a runaway engine—I should have said that the Huddersfield lines, whose gradients are very steep, are worked by steam—caused damages which cost the municipality nearly £10,000. In 1891 an engine boiler burst—damages this time about £2,000.

On the other hand, it cannot be questioned that the population of Huddersfield prefer to work their lines themselves at a loss rather than hand the operation over to a commercial company. Indeed, I have heard it said by one who was likely to be in a position to know that the accounts of the tramways were so adjusted in years of good trade as to avoid showing a profit; for the act of Parliament under which the Huddersfield tramways were constructed especially provided that the power of the municipality to work the lines itself should cease if

at any time an adequate rent for the undertaking should be offered by a private commercial company. But it must be remembered that the population of Huddersfield, who pay on the average 4s tram fares apiece per annum, is almost wholly working class, and whereas the working class inhabitants have the bulk of the votes, a small minority of merchants and manufacturers pay the bulk of the rates. It should be added, too, that the working classes of Huddersfield had a special reason for supporting their municipal experiment. In England of late years it has seemed as though workmen's care for reduction in hours were more than for an increase in wages. Now the hours of tramway servants have always been excessively long. Fourteen and fifteen hours' work was by no means unknown a few years back. Even now 12 hours are, I believe, normal in various towns. As long ago as 1888 the Huddersfield corporation reduced the hours of all their tramway employees to a uniform eight hours' day, and this without any reduction of wages.

**Power of Purchase.**—But Huddersfield, as I have said, occupies a unique position. No other town has had more than a very short experience of municipal working. Town tramways in this country have, as a rule, been constructed subject to the provisions of the Tramways Act, 1870, or else of special acts framed very much on the same lines. The main provisions of the Tramways Act, 1870, are as follows: The tramway may be constructed either by the municipality or by private promoters; if the municipality constructs the lines it may either leave them open to be used by all comers on payment of authorized tolls—no instance has, I believe, occurred in practice of this course being adopted—or lease the right of user to any person or company. If, on the other hand, the tramways are constructed by private promoters, the act provides that at the end of 21 years, and again at the end of every subsequent period of seven years, the local authority has power to compel the promoters to sell their undertaking "upon terms of paying the then value (exclusive of any allowance for past or future profits of the undertaking or any compensation for compulsory sale or other consideration whatsoever) of the tramway." In other words, the tramway company, in return for a semi-exclusive user of portion of the street for 21 years, is required at the end of that period to pay a deferred rent in the shape of an obligation to sell its lines at their then value, which may be said to be cost, less depreciation, no allowance, therefore, being made for profits past or future or for good-will as a going concern.

The bulk of the important tramways of the country were constructed before 1880, and, accordingly, the question of their acquisition by the municipality, in cases where they were constructed by a company to start with, has either had to be faced within the last year or two or will have to be dealt with in the immediate future. A good many of the most important towns, however, constructed their own tramways to start with; Liverpool, Manchester, Leeds, Sheffield and Glasgow did so, for instance. Of late years it may be said that practically in every case the municipality has preferred to construct its tramways itself, and recently the powers of purchase contained in the act of 1870 have been pretty freely put in force. Before long, it is safe to say, municipal ownership of tramway lines will be the rule and private ownership a comparatively rare exception. The accepted view here is that municipal ownership has two conspicuous advantages: (1) That the repair and maintenance of the streets are much simpler than where two authorities are concerned, and (2) the municipality can make better terms with a company when the capital to be provided by private enterprise is comparatively small than where the whole construction cost has to be so found.

**Public Working.**—It is, however, only quite recently that municipalities have advanced from owning to working. Up till the session of 1896 a standing order of Parliament provided that no bill authorizing a municipality to work its own tramways should be so much as considered. Glasgow, however, had from the beginning, in 1870, by what was almost an accident, statutory power to work, and that power it began to exercise in July, 1894, without needing any new parliamentary authority for the purpose. But by the time 1894 was reached the wave of municipal socialism, as it is the fashion to term it, had begun to reach Parliament and the public authorities. Various towns obtained either by direct statutory authority, or by revocable license from the Board of Trade, granted till such time as a satisfactory tender should be submitted by a lessee, power to work their lines themselves. This was the case with Plymouth and Blackpool (our Lancashire Atlantic City) in 1893, with Leeds in 1894, with Sheffield, Dover and Hull in 1896. Within the last few weeks Liverpool has entered into an agreement to take over its tramways from the existing lessees, and the agreement will doubtless, in due course, receive parliamentary sanction.

As for the results of municipal operation, I do not think the time has arrived for a final opinion to be formed by impartial persons. Glasgow is taken as the typical instance by those whose habit of mind inclines to socialism rather than to individualism, and Glasgow has, we are assured by such persons, made a triumphant success. It may be so. Undoubtedly Glasgow has put into its experiment a great deal of energy, intelligence and public spirit. That cars, staff and horses are all better than under the old company, I can testify from

personal knowledge. A considerable revenue from advertisements on the cars has been deliberately foregone on æsthetic grounds. Fares have been markedly reduced and half-penny tickets for the first time issued. The hours of the staff have been shortened and their wages increased. And with it all the accounts show a handsome surplus. On the other hand, critics point out that the experiment has been made at a time when forage is exceptionally cheap, that the allowance for depreciation may prove inadequate, and that the surplus, after providing for interest, working expenses and depreciation, though substantial, and admittedly larger than the rent paid by the dispossessed tramway company, is by no means as large as that company would have been ready to pay in order to secure a renewal of its lease.

The Glasgow municipal tramways have had two interesting points in their short history. In the first place they had to face at the outset keen competition from the expropriated tramway company, which set up a fast and well-horsed service of omnibuses on all the main routes and ran them side by side with the tramcars. At one time it looked as if the opposition would be serious, but I understand it is now practically dead and an admitted failure. Tien again there was a good deal of discontent, leading at one time, I believe, to an actual strike, among the tramway staff themselves, who seem to have fancied in some cases that they were to be paid handsomely for playing at work during the minimum of hours that they were nominally on duty. There was a good deal of stir in the city and the newspapers were full of reports of indignation meetings held by the "tramway slaves." In the upshot the common sense of the citizens seems to have supported the Town Council in refusing to make municipal employees a privileged order of workmen, and the agitation is apparently quite at an end, at least for the present.

One word in conclusion. Municipal management has unquestionable and apparently unavoidable disadvantages. No tramways committee of a municipality can possibly exercise the same prompt and despotic authority as the chairman or general manager of a tramway company. I remember a few years back the chairman of a London tramway company stating that he had saved his dividend for the half-year by entering into a contract for some hundreds of thousands of bushels of oats an hour before the London Corn Exchange got news of the intention of the Russian government to close all the Russian ports against the export of grain. On the other hand, the risk of jobbery in municipal management is—I will not say non-existent—but so small as to be hardly worth considering. Further, the men who become members of our municipal councils are not on the average much inferior to those who become directors of commercial undertakings of similar magnitude, and the standard is at present rapidly rising. I can speak on this point from personal knowledge, having had 10 years' experience on public boards in London of various kinds. Now Londoners are constantly and justly reproached by the inhabitants of provincial cities for their comparative indifference as to the management of their municipal affairs. Yet I should have no difficulty in mentioning quite a considerable number of men who have given gratuitously a large portion of their time to the local government of London, and whose services would have been valuable and valued on any commercial board of directors in the country. Nor are the engineers in the service of the municipalities inferior to the men who would have the management of tramways belonging to commercial companies, and their tenure of office is equally secure and permanent.

In all these respects England has, or at least so I should judge from American writings, an advantage over the United States. Whether even here municipal management will be able to approve itself more in the interest of the public than the system of commercial companies which it is superseding must be left to the future to decide.

LONDON, May 6, 1897.

## TECHNICAL.

### Manufacturing and Business.

The new factory of the Homer Steel Fence Co. at Battle Creek, Mich., has been finished. The company intends to increase its railroad business.

The Shreveport City (La.) electric railroad is in the market for 1½ miles of new or relaying 60-lb. T rails, 4½ to 5½ in. high.

J. A. L. Waddell, Consulting Engineer, has removed his office from the Keith & Perry Building, Kansas City, Mo., to larger quarters in the Gibraltar Building.

The Dorner & Dutton Co., of Cleveland, O., has been formed to deal in street and electric railroad supplies. The capital stock is \$50,000, and the incorporators are J. H. Van Dorn, E. J. Leighton, H. H. Hodell, W. A. Dutton and H. A. Dorner.

The Bass Foundry & Machine Co., of Fort Wayne, Ind., has received a contract to furnish the engines for a new bar mill for the Shenango Valley Steel Co. at New Castle, Pa.

The Baker Forge Co., of Ellwood City, Pa., will add a number of new machines to its plant. These will include a Bement, Miles & Co. steam hammer and a heavy upsetting and forging machine made by the Acme Machinery Co., of Cleveland, O.

The spike mill of the Richmond Standard Spike &



Iron Co., of Richmond, Va., has been put in operation after an idleness of over two years.

A charter was granted May 31 to the Landis Tool Co., of Waynesboro, Pa. The directors are A. N. Strickler, S. B. Rinehart, Daniel Hoover, F. Farthman, Ezra Frick, W. H. Snyder, R. Shover, T. B. Smith and W. T. Omivake.

The co-partnership between Horace See and W. H. Jaques has been dissolved and the offices at 1 Broadway, New York City, will be occupied by Horace See as Consulting Engineer.

Stanley G. Flagg & Co. are erecting an addition to their iron and brass foundry at Pottstown, Pa. The building will be of brick, 50 x 56 ft., and used for galvanizing purposes.

John E. Howe, formerly Secretary of the Buckeye Malleable Iron & Coupler Co., Columbus, O., has resigned from that position on account of ill-health, and has been succeeded by Joseph Stafford, who has been connected with the company for a number of years.

The Berlin Iron Bridge Co., of East Berlin, Conn., is furnishing and erecting the steel framework and corrugated iron covering for a fireproof building for the Acme Malleable Iron Works, of Buffalo, N. Y. The building will be 81 x 60 ft., and used for storing patterns.

The Walker Engineering Co. has been incorporated under the laws of New Jersey by Isaac Walker, Edward F. Walker and Wetland D. Gould, of Chester County, Pa.; Atwood Birber, of Bethlehem, Pa., and Frank Downs, of Holly Beach, N. J., to conduct a general engineering business, including building electric railroads.

The Montreal Car Wheel Co., of Montreal, P. Que., and the St. Thomas Car Wheel Co., of St. Thomas, Ont., have leased the foundry of the Grand Trunk Railway at Hamilton, Ont. They will make all the car wheels required for the Grand Trunk in Canada in addition to doing a general wheel business. Wheels will also be made for street railroads. The Hamilton shops employ 200 men.

In our issue of May 21 we referred to a contract given to the New York Car Wheel Works, of Buffalo, N. Y., by the Schoen Pressed Steel Co., of Pittsburgh, Pa., for 4,800 wheels for the 600 steel cars for the Pittsburgh, Bessemer & Lake Erie road. These wheels will be made of the New York Car Wheel Works' T. M. Special grade of chilled iron (not steel, as stated) which contains a large percentage of bog ore iron and other special grades of metal. The wheels will weigh about 665 lbs. each and will be bored out, ground true to center and balanced before being shipped to Pittsburgh.

The Ingersoll-Sergeant Drill Co., Havemeyer Building, New York City, has been absorbed by an English company formed for that purpose, with a capital of \$4,000,000. M. P. Grace, J. E. Dudley, R. W. Chapin and G. A. Phillips are the London Directors, and W. R. Grace, John A. McCall and W. L. Saunders the American Directors. The factory of the American company is at Easton, Pa.

#### Iron and Steel.

No. 1 furnace of the Brooke Iron Co., at Birdsboro, Pa., is being dismantled. This furnace was built in 1853.

The first heat at the new Buhl steel mill at Sharon, Pa., was made on May 24. The mill has cost about \$600,000.

The Hollidaysburgh, (Pa.) Iron & Nail Works have bought the Midvale rolling mill and railroad spike works, located at Roanoke, Va. It is proposed to add a steel department to the works.

Furnace C of the Maryland Steel Co., Sparrows Point, Md., blew in May 26, after an idleness of four years. It is the third furnace of this company now in blast and has a daily output of 1,800 tons of pig iron.

The new buildings of the DuBois Iron Works at DuBois, Pa., will consist of a foundry 80 x 100 ft., boiler shop 80 x 100 ft., and machine shop 80 x 260 ft. The buildings will be of steel and brick with slate roofs. Three large traveling cranes and several smaller cranes to be controlled by compressed air will be installed.

#### New Stations and Shops.

The Pennsylvania has recently completed a new passenger station at Parkersburg, Pa. The new building is of brick and contains two waiting-rooms, a ticket office and a baggage-room.

The Boston & Maine has just completed a new frame passenger station at Wayside Inn, Mass., on its Central Massachusetts Division.

Work on the new freight station of the Union Pacific at Greeley, Col., is almost finished. The foundation was built by Thomas Hayes, of Denver, and the brick work by W. W. Hull & Co., of Denver. The balance of the work is being done by the railroad company.

The plans and specifications for the Grand Central Station, New York City, have been completed and are being estimated upon. If the contracts are awarded this month the work should be practically completed by next Christmas.

The Atchison, Topeka & Santa Fe has awarded a contract to Fellows & Van Sant, of Topeka, Kan., for a new station at Dodge City, Kan., to cost \$35,000. Another contract has been awarded by the company to Henry Bennett, of Topeka, for a new station at Hutchinson, Kan., at a cost of \$12,000.

The Atlanta, Knoxville & Northern has recently built new shops at Blue Ridge, Ga. These shops are equipped with the latest improved machine tools for locomotive and car works, furnished by the Niles Tool Works Co., of Hamilton, O., and are placed in a systematic manner to facilitate rapid work. Mr. T. W. Newell is Master Mechanic in charge of the locomotive and car department.

The Southern Railway has let the contract for the warehouse to be built by the Southern Railway at Pinner's Point, Va., to John P. Pettyjohn, of Lynchburg, Va. This warehouse will be 252 x 700 ft. in size. The contract for the wharf and bulkheads has been let to Colin McLean, 1 Broadway, New York City.

Plans have been prepared by the Detroit & Lima Northern for new shops to be built at Lima, O. The buildings will consist of a machine shop 168 x 160 ft.; passenger car shop, 150 x 68 ft.; power house, 40 x 26 ft.; boiler shop, 150 x 40 ft.; paint shop, 150 x 40 ft.; open repair shed, 108 x 40 ft.; offices, store rooms and other small buildings. It is also proposed to build a round-house with a capacity for 12 locomotives.

Plans have been prepared and approved by the Cincinnati, Hamilton & Dayton for its new shops at Lima, O. All of the buildings will be of brick and will be lighted by electricity. They will comprise a paint shop 268 x 104 ft., upholstering room 50 x 30 ft., freight car shop for repair work 120 x 224 ft., paint supply and mixing room 160 x 84 ft., boiler and engine room 40 x 50 ft. The capacity of the repair shop will be 15 cars. A transfer track 65 ft. wide and 448 ft. long, to be operated by electricity, is also proposed. It is expected that work on these new buildings will be begun within a short time.

#### Locomotives at Purdue University.

On Thursday, May 20, the experimental locomotive "Schnectady, No. 1," was moved from its place in the Purdue Locomotive Testing Laboratory and in the afternoon the students collected and short addresses were made by Dr. James H. Smart, President of the University; Prof. W. F. M. Goss, Mr. H. G. Prout, of the *Railroad Gazette*, and Prof. Thomas F. Moran. The engine was then delivered under steam to the Lake Erie & Western Railroad to be forwarded to the Schnectady Locomotive Works, where it will be overhauled and eventually be put into road service. The new locomotive, "Schnectady, No. 2," will be delivered at Purdue University in the early part of September and in the meantime the "balanced engine, No. 1," designed by Mr. George S. Strong and belonging to the Balanced Locomotive & Engineering Company, of New York, will be carefully tested by Professor Goss, under the direction of Mr. Geo. S. Morison.

The Strong engine has a pair of trailing wheels, four-coupled driving wheels and a leading, 4-wheel truck. The firebox consists of two breeches which come together back of the barrel of the boiler, and the firing is done through two fire doors. The engine is a compound with two low-pressure cylinders outside and two inside the frames, all of which act on the first driving axle. The first driving axle is a hollow forging, and the valve motion is a special design by Mr. Strong. A peculiar feature of the construction is that the weight of the reciprocating parts used in connection with the low-pressure cylinders balances the weight of the corresponding parts of the high-pressure cylinders so that it is only necessary to place counterweights in the driving wheels sufficient to balance the revolving weights. Rocker valves are used and separate steam chests are provided for each end of the several cylinders.

#### The New York and New Jersey Bridge.

Brig.-Gen. John M. Wilson, Chief of Engineers, U. S. A., has made a report to the Secretary of War, in which he says that the New York & New Jersey Bridge Companies have forfeited their right to build the bridge over the Hudson. The authority granted by the War Department provided that the work on the bridge should begin within one year after the approval of the plans, and that at least \$250,000 should be expended during the first 12 months of construction. The question was raised whether the rough plans of last year or the detailed plans of this year shall determine the beginning of the period within which the company should begin work. General Wilson holds that a decision by the Secretary would not affect the case, as the company has forfeited its right to build the bridge by not making an expenditure of \$250,000, in the year beginning March 13, 1896, on the work of construction.

#### Composite Brakeshoes.

One of the interesting exhibits at the Master Car Builders' Convention this year will be brakeshoes made of cast iron, with cork blocks inserted in cavities in the face or tread of the shoe. Shoes from several different stages of service and showing various conditions of wear will be shown. The *Railroad Gazette* of Dec. 11, 1896, gave an illustrated description of these shoes. Since then they have been in service on several railroads, including the Boston & Maine, with, as we are assured, satisfactory results. The M. C. B. Association tests have heretofore shown the same shoe with wooden inserts to give a very high coefficient of friction (with other good features), but they also showed that the wood plugs would not stand the heat generated in heavy railroad service. It has been found that cork will stand this heat; that the heat causes the cork to swell and expand, and these shoes will show that the cork will remain till it is entirely worn out and uniformly with the metal. It has also been demonstrated that cork gives greater friction than wood. There is no question about

the retarding effects of this shoe. The matter of mileage and life will depend on the hardness of the metal. It is believed that chilled-iron shoes will be found to work well with these cork inserts. These shoes are made by the Composite Brake Shoe Co., of Boston.

#### Knit Padding for Car Seats.

The Knitted Mattress Co., of Canton Junction, Mass., has received letters from the Delaware, Lackawanna & Western, International & Great Northern and Western Maryland railroads, testifying to the saving and durability in the use of knitted padding in place of curled hair for car seats and backs. It has been used by the Western Maryland about two and a half years, and Mr. David Holtz, Master of Machinery, states that experience has shown that one man can upholster five or six seats with the knitted padding against one with curled hair. The results in service show the padding to be superior in some respects to hair.

#### The Texas at Old Point Comfort.

Through the energies of Mr. W. R. Trigg, President of the Richmond Locomotive Works of Richmond, Va., those in attendance at the conventions at Old Point Comfort will be allowed to inspect the machinery of the United States battleship Texas from June 7 to 17. The engines for the ship were built by the Richmond Locomotive Works.

#### Lake Notes.

Last week the steelship Andrew Carnegie took from Duluth 277,160 bu. of grain on 16 ft. of water, a weight of 5,591 tons, besides fuel. This surpasses all upper lake cargoes, and beats the other two leading vessels, the Queen City and Crescent City, the former by 128 tons and the latter by 41 tons. The Queen City took out an iron-ore cargo of 4,843 gross or 5,424 net tons from Ashland this week, the Siemens 4,810 gross tons from Duluth, and the Constitution 4,713 gross tons from Ashland. All these are new vessels of the largest class, and are exceeding the estimates made by their builders as to their capacity.

In the 24 hours ended Saturday, May 20, at midnight, 38,626 gross tons of iron ore was loaded into vessels from the docks of the Duluth, Missabe & Northern road at Duluth. But 11 vessels were used, the largest load being 4,709 gross tons. Twenty-three vessels loaded 100,000 tons during the week at Two Harbors.

The Independent water line, operated by the flour millers of Duluth and Superior, has chartered the steamer I. W. Nicholas for two more trips at a rate that gives the millers an advantage of 50 cents a ton over regular lines to New York. The vessel carries some 4,000 tons.

Iron-ore shipments from the Gogebic Range are very small. Up to last week, the two railroads operating to Ashland carried about 80,000 tons of ore as against some 250,000 tons during the same period of last year.

#### THE SCRAP HEAP.

##### Notes.

A new law makes mileage book coupons legal tender for railroad fare when presented at a ticket office. The law provides a blanket which covers the members of a firm purchasing a mileage book, the members of their families and all their employees. It might just as well include any person who presents it, for a conductor does not know and cannot find out whether the coupons are presented by any of the many persons who have a right to ride upon them, or by some heathen who is outside the protection of a firm of which he knows nothing. —*Republican, Binghamton, N. Y.*

Complaint has been made to the Railroad Commissioners of Wisconsin that the Minneapolis, St. Paul & Sault Ste. Marie ignores the law, recently passed in Wisconsin, limiting passenger fares to 3 cents a mile.

Severe retrenchment continues to be reported on various railroads. On the Pennsylvania Lines West of Pittsburgh news items of this kind appear at many different places. The Norfolk & Western has abolished the office of Division Freight Agent of the Western General Division.

Railroad Commissioner Kayler, of Ohio, has sent to the railroads a circular calling attention to the law requiring frogs and switches to be blocked, and also to the state law requiring the equipment of cars with automatic couplers before Jan. 1, 1898. He asks for a report within 60 days giving the number of cars operated in Ohio, showing how many are, and how many are not, equipped so as to comply with the law.

The Auditor General of Pennsylvania having decided that railroad bonds owned in Pennsylvania must pay a tax in that state, the treasurers of some of the Pennsylvania railroads have announced that hereafter coupons of such bonds, when presented for payment, must be accompanied by a statement showing whether the owner resides in Pennsylvania or not. Unless advised that the owner resides outside that state, the railroad company will deduct the amount of the tax before paying the interest.

Both houses of the Michigan Legislature have passed the Merriman bill, by which the amount of taxes collected from the railroads in that state annually is expected to be raised from about \$741,000 to \$946,000. Before the adoption of certain amendments the provisions of the bill were such as to produce a much larger increase. As passed, it makes the percentage tax 5 instead of 4½ on the gross income of roads earning over \$8,000



a mile. It adds, also, an entirely new tax of 10 per cent. on the gross income per mile of union station and depot companies whose earnings are in excess of \$20,000 per mile.

The Supreme Court of Minnesota has declared the Public Warehouse law of 1895 unconstitutional. The law provided that every public warehouse other than those used for storage of grain should secure licenses from the government within 30 days after the passage of the act, and that all railroad companies should be required to turn over to the warehouse companies all goods which had been in their possession uncalled for 20 days or more. The storage company was to pay the transportation charges and take a lien upon the goods for the amount. The Chicago, Milwaukee & St. Paul, the Great Northern and the Chicago Great Western contested the law.

The United States District Court in Ohio, on petition of the Pennsylvania Company, has enjoined the municipal officers of Lima, O., against issuing or selling \$98,000 of bonds for the purchase of grounds, machinery or shops for any railroad company, or giving any portion of said bonds or the proceeds thereof to any railroad company. The case will be heard June 28. It appears that the city voted the sum named for the purpose of securing the Lima Northern shops and to aid the Cincinnati, Hamilton & Dayton to the extent of \$33,000 in a similar manner. The bonds were called park bonds in order to evade the provision of the constitution forbidding grants of aid to railroad companies.

The Commerce Committee of the United States Senate will probably report the Foraker Bill with amendments this week, though Senator Chandler, a member of the Committee, has actively opposed this and all bills looking to the legalization of pooling. The Committee has made a number of amendments to the bill. One of these limits all pooling contracts to a term of four years; another provides that an order of the Commission, disapproving a pool, shall go into effect at once without appeal, and a third increases the penalty for false billing and other discriminations in rates, making a second offense punishable by imprisonment for one year. It is proposed also to amend section 15 of the Interstate Commerce law so as to specifically authorize the Commission to issue an order to a railroad where rates are found unreasonable, and making it the duty of the railroad to comply with the order; but this clause would be made to apply only to matters concerning which specific complaint is made in writing.

#### The Purdue Railroad Lectures.

In the evening of Thursday, May 20, Mr. H. G. Prout, Editor of the *Railroad Gazette*, addressed the students of Purdue University on "The Development of the Steel Rail." This lecture was one of the course on railroad subjects which has been arranged for by the Faculty, in which course one lecture is given every two weeks.

#### Mr. Brazee and the "Railway Conductors' Club."

Two peculiar organizations, the "Railway Conductors' Club" and the "National Railway Protective League," were partially described in the *Railroad Gazette*, May 14, page 341. The brief account given was deemed sufficient to warn railroad officers and employees. Mr. James E. Brazee, whose name was given as one of the "governors" of the club, asks us, in justice to him, to mention that, although he was originally a member and an officer, he promptly resigned and withdrew as soon as he learned its character and real objects. Mr. Brazee is a railroad conductor and a member of the Orange County, N. Y., Board of Supervisors.

#### The Bridgeport Grade Crossing Matter.

The Connecticut Supreme Court in the Bridgeport Railroad improvement case holds that Connecticut municipalities have the right under legislative acts to contribute to the expense of abolishing grade crossings, and of other railroad improvements which promote public safety. Such expense, the Court says, does not belong to the category of aid of railroad companies, which is prohibited by the state constitution, both for the reason that it relates to public safety and because such railroad improvements neither add to nor subtract from the assets of either the railroad corporation or the municipality.

#### The Long Island Railroad in Brooklyn.

The following gentlemen have been appointed members of the Atlantic Avenue Improvement Commission by Mayor Wurster, of Brooklyn: Eugene G. Blackford, Edw. H. Hobbs, Edward F. Linton, William E. Phillips and Walter M. Meserole, representing the city of Brooklyn, and Charles M. Pratt and William H. Baldwin, Jr., representing the Long Island Railroad Co. The first five commissioners named were the members of the old commission. Mr. Pratt and Mr. Baldwin are Chairman of the Board and President, respectively, of the Long Island Railroad.

#### Sixteenth Street Crossing—Chicago.

In the *Railroad Gazette*, April 23, was given an outline of a plan for elevating the tracks at the Sixteenth Street Crossing, Chicago, as covered by an ordinance passed by the City Council March 9. This plan, as stated in the article referred to, was at the last moment rejected by the Chicago & Western Indiana on the ground that the terminal facilities of the Chicago & Erie, one of its tenant lines, would be seriously injured. The officials of the railroads involved have now agreed to a new plan for track elevation at this point, and in accordance with the plans which they have prepared an ordinance was presented which passed the Chicago City Council May 17. This ordinance has been signed by the Mayor and gives the railroads until June 23 to formally file their acceptances; before this time or until all the roads have formally agreed to carry out their portions of the work there is no assurance that the plan will not be rejected the same as those previously made. The new ordinance provides for the same general arrangement as that described April 23, and differs only in that the St. Charles Air Line is now required to elevate its tracks to a point 23.5 ft., instead of 22.25 ft. above City datum at Clark street, and to shift them to the

south of their present location 85 ft. instead of 75 ft. The Chicago, Rock Island & Pacific and the Lake Shore & Michigan Southern are to cross the St. Charles Air Line at the new grade as before. The Atchinson, Topeka & Santa Fe is to depress its tracks 3 ft. at Clark street, instead of 4 ft., and while the Chicago & Western Indiana is required to depress at Clark street to the same point as in the former arrangement, its tracks are to be shifted but 15 ft. north of their present location, which amount will not interfere with the tracks leading to the Chicago & Erie freight house and yards situated between Fourteenth and Fifteenth streets. The general opinion of railroad officials at Chicago is that this plan will meet with the formal approval of the roads, but there are others who are very skeptical, and who do not look for active operations to commence for sometime to come.

#### LOCOMOTIVE BUILDING.

The Dickson Mfg. Co., of Scranton, Pa., is building one locomotive for the Buffalo & Susquehanna Railroad.

The Brooks Locomotive Works, of Dunkirk, N. Y., has received an order to build one double end side tank locomotive for the Baisal Railway of Japan.

The eighteen engines ordered by the Boston & Maine from the Manchester Locomotive Works, and referred to in our last issue, will be equipped with Nathan and Siebert lubricators, Crosby Thermomatic steam gauges, French, Scott and Pickering springs, Latrobe, Midvale and Standard tires, Ashton and Star Brass safety valves, Hancock injectors, Crosby No. 5 chime whistles, packing of the U. S. Metallic Packing Co.'s style, made by the railroad, and Westinghouse outside equalized 9½-in. pumps.

The six passenger locomotives now being built by the Baldwin Locomotive Works for the Cape Government Railways of South Africa are similar to the Atlantic type passenger locomotives built for the Japan Railway Co., by the Baldwin works, and shown by us Feb. 26, page 149. The Japanese locomotive there described has four drivers coupled, a four-wheeled truck forward and a two-wheeled truck under the firebox. The firebox is wide, being extended over the rear frame. The gauge is 3 ft. 6 in., and the total weight of the engine about 100,000 lbs., of which 52,000 lbs. is on the drivers. The cylinders are 16 in. x 22 in., and the drivers 56 in. diameter. The boiler is 58 in. diameter. The firebox is of copper 6 ft. long x 5 ft. wide.

#### CAR BUILDING.

The Michigan-Peninsular Car Co. recently received an order to build 50 furniture cars for the Chicago & Grand Trunk.

The Missouri Car and Foundry Co., of St. Louis, Mo., has received an order from the Mexico, Cuernavaca & Pacific for 50 box and two caboose cars.

It is stated that the Baltimore & Ohio Southwestern has instructed the Ohio Falls Car Mfg. Co., of Jeffersonville, Ind., to build 200 freight cars on the order for 600 which was let some time ago and afterward countermanded.

#### BRIDGE BUILDING.

Burks Falls, Ont.—The Armour Township Council has decided to ask tenders for building a steel bridge over the north branch of the Magnetawan River.

Catawissa, Pa.—Bids are asked until June 15 for rebuilding the bridge over the Susquehanna River at this place. Amos H. Mylin, Auditor General, Harrisburg, Pa.

Cincinnati, O.—The Commissioners of Hamilton, Clermont and Warren counties have given the contract for the bridge at Loveland to the Brackett Bridge Co., for \$4,450.

Cleveland, O.—Plans for the proposed viaduct at Para street have been adopted by the Board of Control. It will extend from Para to Martin streets, and its estimated cost is \$21,000. M. E. Rawson, City Engineer.

An ordinance providing for rebuilding the superstructure of the bridge over the Cuyahoga River at Center street has been passed.

Evansville, Ind.—Bids will be received until June 11 for building a bridge across Big Slough. Fred. Grote, Chairman Waterworks Trustees.

Fort Mill, S. C.—Bids will be received until June 14 for an iron bridge across the Catawba River at Harris's Ferry, York County, S. C. Plans may be seen at the office of J. M. Spratt, this place. T. G. Culp, Supervisor, York County.

Harrisburg, Pa.—Out of all the petitions for county bridges, it is probable those for bridges over Bear Creek, near Linglestown, over Rattling Creek, at Lykens, and over Weinisco Creek, at Williamstown, will be granted.

Manitowoc, Wis.—The city officials have asked the Chicago & Northwestern to put a draw in its bridge across the river, and it is expected that the work will be done this summer.

Montreal, Que.—The Grand Trunk has given the contract for six spans of the superstructure of the New Victoria Bridge to the Dominion Bridge Co., Montreal. The Union Bridge Co., Athens, Pa., has the contract for about one-third of the superstructure, and the Detroit Bridge & Iron Works, Detroit, Mich., has the contract for the remaining spans. There are 21 spans in all.

Palmer, Wash.—Two steel bridges are to be built this season on the Cascade Division of the Northern Pacific near here.

Pittsburgh, Pa.—Bridge contracts have been awarded by Director Bigelow as follows: Penn avenue bridge, to Gustave Kauffman, at \$13,000; Snady avenue bridge, to Shultz Bridge & Iron Co., at \$13,225; South Highland avenue bridge, to Shultz Bridge & Iron Co., at \$17,975; Saw Mill Run bridge, Fort Pitt Bridge Works, \$3,940; viaduct, Forbes to Lain street, Fort Pitt Bridge Works, \$5,270.

Port Huron, Mich.—Bids are asked until June 19 for a steel swing bridge, with swing span 220 ft. long and steel trestle approaches 231 ft. long, with 18-ft. roadway and two 6-ft. sidewalks. F. F. Rogers, City Engineer.

Roaring Creek, W. Va.—The Commissioners of the Staunton and Parkersburg Turn Pike have ordered a new steel bridge built over Roaring Creek at this place and another over Beaver Creek, near Beverly. The bridges are to replace wooden structures recently carried away by floods.

#### RAILROAD LAW—NOTES OF DECISIONS.

##### Carriage of Goods and Injuries to Property.

In Wisconsin it is held by the Supreme Court that depot grounds, not required to be fenced, prima facie include all of the right of way left unfenced between the switches and the cattle guards, on either side of the platform, including the switches and side tracks, unless they are shown to be unreasonable in extent.<sup>1</sup>

In California the Supreme Court decides that where a railroad receives freight for shipment under an agreement to forward it to its destination, the stipulation that its liability as carrier shall cease on delivery of the goods to the first connecting line, the contract also providing for "passenger service through," the duty of the company as forwarding agent continues till the goods arrive at their ultimate destination, and it is therefore liable for any delay caused by its failure to notify each successive connecting road of the conditions of the contract in respect to the manner of transportation.<sup>2</sup>

In a case in the Indian Territory the Court decides that where 224 reels of barbed wire were delivered to a carrier for shipment over several connecting steamboat and railroad lines, in an action by the consignee against the railroad company from which he received the wire, for injury thereto, on the introduction by defendant of a bill of lading issued by an intermediate carrier, showing that the wire was received by the initial carrier in good order, the burden of proof was on defendant to show that the injury occurred before it received the wire; and this though the bill of lading, after mentioning the packages, contained the phrase "contents and value unknown," and provided that no carrier should be responsible for loss or damage unless it was proved to have occurred during the time of its transit over the particular carrier's line.<sup>3</sup>

The wire above mentioned was delivered to carrier for shipment over several connecting steamboat and railroad lines. One of the connecting railroads issued a bill of lading acknowledging receipt from the consignor of a bill of lading issued by the initial carrier for the goods, in apparent good order, to be transported over such railroad, and delivered "in like good order" to another railroad named. The Court holds that the bill of lading issued by such railroad was an acknowledgment that the goods were delivered to the initial carrier in apparent good order.<sup>4</sup>

The Texas Court of Appeals holds that the association of connecting carriers, under an agreement that each shall bear the expenses of the operation of its own line, and that the gross receipts for the continuous transportation of freight, for which one rate is given, shall be divided *pro rata*, does not render them partners, and jointly liable for damages to goods on any line, where the contract of shipment limits each carrier's liability to damages occurring on its own line.<sup>5</sup>

In Texas it is held that failure of a railroad to communicate to its connecting line the direction that the goods are shipped in care of a certain railroad, resulting in their diversion to another route than that directed, while making it liable for injury resulting, does not, in connection with such consequent diversion, amount to a conversion, and *ipso facto* make it liable for the value of the goods.<sup>6</sup>

##### Injuries to Passengers, Employees and Strangers.

In Indiana the porter of a sleeping-car took charge of and placed together the plaintiff's baggage, including a seal-skin coat, for the purpose of taking it from the car on the arrival of the train at plaintiff's destination. When plaintiff alighted the porter followed her with her baggage into the station. It was then discovered that the coat had disappeared, and, on returning to the car, it was not found. The car had been left in charge of the conductor. The Appellate Court holds that the facts show conclusively negligence on the part of the employees, for which the company was liable.<sup>7</sup>

In Tennessee the Supreme Court rules that a woman 63 years old, and crippled by a former dislocation of her hip, traveling in the caboose of a freight train, is negligent in leaving her seat to get a drink while the train is switching cars, so as to prevent her recovery for injuries from a fall caused by the jolt in coupling cars; it appearing that the jolt was not greater than was usual in such cases, and that she was aware that such jolts necessarily followed in the coupling of cars.<sup>8</sup>

In Minnesota the Supreme Court holds that a passenger on an electric car who, knowing that the car was approaching a sharp curve at a high rate of speed, left his seat, and spoke to the conductor in the vestibule, was not, as a matter of law, guilty of negligence contributing to injuries received by being thrown against the side of the car when the curve was reached, since he had a right to presume that the speed would be slackened before the car arrived at that point.<sup>9</sup>

In New York it is held that the fact that a foreman of a street car company had at previous times notified an employee, when giving him a pass, that "he had to ride at his own risk, and that the company was entirely blameless," is not notice to the employee of a claim by the company of exemption from liability on all subsequent occasions on which he used the cars without pay.<sup>10</sup>

In the Federal Court it is said that where a railroad company receives in its yard a car of another railroad, and such car is examined, and notice given that it is defective and is to be returned, the company has fulfilled its duty in regard to the car, and is not liable for injuries resulting from such defect which an employee receives while the car is being shifted about the yard; the negligence, in such case, if any, being that of his fellow-servants.<sup>11</sup>

In Nebraska it is ruled that in an action for injuries received by a servant in attempting to board a moving train upon a sudden command of the master, an instruction that the servant was not negligent unless no one but a reckless man would have obeyed the order was erroneous.<sup>12</sup>

In Massachusetts it is held that in an action for the death of one who fell from a hand car which he was operating, evidence that the gearing of the car was worn, and consequently might have slipped while interstate was pushing on the lever, and caused him to fall, does not justify a recovery, in the absence of evidence that it did slip.<sup>13</sup>

In Texas a coal into whose yard a track is built so as to permit of the unloading of coal cars in the yard is bound, in piling the coal beside the track, to use such care as an ordinarily prudent person would have exercised to avoid injury to employees of the railway company running cars into the yard.<sup>14</sup>

In Nebraska it is decided that in an action by a servant for injuries received in attempting to obey an order of the master to board a moving train, an instruction that "it is in general the duty of an employee to obey the orders of his superior, and in the absence of knowledge or means of knowledge to the contrary, he may presume it safe for him to do so," was erroneous, as implying that the servant might, as a matter of law, presume it safe for him to obey the command.<sup>15</sup>

In New York one riding a bicycle on a street car track need not look behind him for overtaking cars.<sup>16</sup>



In Texas it is only when there is some reason to apprehend that a person on the track at a crossing will not leave in time to avoid danger that the company's employees are bound to attempt to stop the train.<sup>16</sup>

In the Federal Court the plaintiff, injured while caught in a cattle guard, testified that the engineer looked at him when the engine was 500 ft. away, while he was shouting and motioning with his hands, but on cross-examination admitted the truth of a statement by him the day after the accident that, when it was three or four car lengths away, he shouted and waved his handkerchief, but could not attract the engineer's attention. Two of his witnesses testified that they heard his cries when the engine was 200 ft. or less away, while the trainmen testified that it was only 150 ft. away when he cried out. Plaintiff's witnesses estimated the speed of the train at three miles per hour, and defendant's witnesses at four to five miles, and plaintiff's expert testified that a train moving three miles an hour would, on an average, be stopped in 100 ft., while defendant's three experts stated that 190 to 200 ft. would be required in the case of an engine going four miles an hour. The Court decides that the engineer, fireman and brakeman having testified that every means was used to stop on hearing plaintiff's cries, and that the engine could not be stopped in time owing to the slippery state of the rails and other conditions, it was proper to direct a verdict for defendant.<sup>17</sup>

<sup>16</sup> Mills, etc., v. O., St. P. M. & O., 68 N. W. Rep., 995.

<sup>17</sup> C. & N. W. Ry. Co. v. S. P., 46 Pac. Rep., 668.

<sup>18</sup> G. & S. F. v. Jones, 37 S. W. Rep., 84.

<sup>19</sup> G. & S. F. v. Johnson, 37 S. W. Rep., 243.

<sup>20</sup> Booth v. M. K. & T., 37 S. W. Rep., 183.

<sup>21</sup> Voss v. Wagner, 41 N. E. Rep., 1010.

<sup>22</sup> Felton v. Horner, 37 S. W. Rep., 686.

<sup>23</sup> Blondel v. St. Paul Ry., 64 N. W. Rep., 1,070.

<sup>24</sup> Pendergast v. Union Ry., 41 N. Y. S., 927.

<sup>25</sup> A. T. & S. F. v. Meyers, 74 Fed. Rep., 413.

<sup>26</sup> C. R. I. & P. v. McCarty, N. W. Rep., 633.

<sup>27</sup> Clare v. N. Y. & N. E., 41 N. E. Rep., 1,051.

<sup>28</sup> Fry v. Hillan, 37 S. W. Rep., 350.

<sup>29</sup> C. R. I. & P. v. McCarty, 68 N. W. Rep., 633.

<sup>30</sup> Rooks v. H. W. S. & P. F., 41 N. Y. S., 824.

<sup>31</sup> T. & P. v. Roberts, 37 S. W. Rep., 870.

<sup>32</sup> Sheehan v. St. P. & D., 76 Fed. Rep., 201.

## MEETINGS AND ANNOUNCEMENTS.

### Dividends.

Dividends on the capital stocks of railroad companies have been declared as follows:

*Boston & Albany*, quarterly, 2 per cent. payable June 30.

*Chicago Junction Railways & Union Stock Yards Co.*, quarterly, 1½ per cent. on the preferred stock and 4 per cent. on common stock, both payable July 1.

*Delaware & Hudson Canal*, quarterly, 1½ per cent. payable June 15.

*Philadelphia, Wilmington & Baltimore*, 3 per cent., payable July 1.

*West End (Boston)*, 4 per cent., on preferred stock, payable July 1.

### Stockholders' Meetings.

Meetings of the stockholders of railroad companies will be held as follows:

*Chicago, St. Paul, Minneapolis & Omaha*, annual, Hudson, Wis., June 5.

*St. Paul, Minneapolis & Omaha*, annual, Hudson, Wis., June 5.

*New York, Lake Erie & Western Coal & Railroad Co.*, annual, Bradford, Pa., June 14.

*Oregon Railway & Navigation Co.*, annual, Portland, Or., June 21.

*St. Joseph & Grand Island*, annual, Ellwood, Kan., June 8.

### Technical Meetings.

Meetings and conventions of railroad associations and technical societies will be held as follows:

The *Association of Railway Claim Agents* will hold its convention at St. Louis, Mo., during the last week of May, 1897.

The *Master Car Builders' Association* will hold its annual convention at Old Point Comfort, Va., beginning June 8, 1897.

The *National Association of Local Freight Agents' Associations* will hold a convention at Washington, D. C., on June 8, 1897.

The *American Railway Master Mechanics' Association* will hold its annual convention at Old Point Comfort, Va., beginning June 15, 1897.

The *National Association of Car Service Managers* will hold a convention at Boston, Mass., on June 16, 1897.

The *Association of Railway Telegraph Superintendents* will hold a convention at Niagara Falls, N. Y., on June 16, 1897.

The *Ohio State Tramway Association* will hold its next meeting at Columbus, O., on June 15.

The *Train Despatchers' Association of America* will hold its tenth annual convention at Detroit, Mich., on June 22, 1897.

The *American Society of Railroad Superintendents* will hold its next meeting at Nashville, Tenn., beginning Sept. 22.

The *American Society of Civil Engineers* meets at the House of the Society, 121 East Twenty-third street, New York, on the first and third Wednesdays in each month, at 8 p. m.

The *Association of Engineers of Virginia* holds its formal meetings on the third Wednesday of each month, from September to May, inclusive, at 710 Terry Building, Roanoke, at 1 p. m.

The *Boston Society of Civil Engineers* meets at 715 Tremont Temple, Boston, on the third Wednesday in each month, at 7:30 p. m.

The *Canadian Society of Civil Engineers* meets at its rooms, 112 Mansfield street, Montreal, P. Q., every alternate Thursday, at 8 p. m.

The *Central Railway Club* meets at the Hotel Iroquois, Buffalo, N. Y., on the second Friday of January, March, May, September and November, at 9 p. m.

The *Civil Engineers' Club of Cleveland* meets in the Case Library Building, Cleveland, O., on the second Tuesday in each month, at 8 p. m. Semi-monthly meetings are held on the fourth Tuesday of each month.

The *Civil Engineers' Society of St. Paul* meets on the first Monday of each month, except June, July, August and September.

The *Denver Society of Civil Engineers* meets at 3 Jacobson Block, Denver, Col., on the second Tuesday of each month except during July and August.

The *Engineering Association of the South* meets on the second Thursday in each month, at 8 p. m. The Association headquarters are at the Cumberland Publishing House, Nashville, Tenn.

The *Engineers and Architects' Association of Southern California* meets each third Wednesday of the month in the hall of the Chamber of Commerce, Los Angeles, Cal.

The *Engineers and Architects' Club of Louisville*

meets in the Norton Building, Fourth avenue and Jefferson street, on the second Thursday each month at 8 p. m.

The *Engineers' Club of Cincinnati* meets at the rooms of the Literary Club, No. 25 East Eighth street, Cincinnati, O., on the third Thursday in each month, at 7:30 p. m. Address P. O. Box 938.

The *Engineers' Club of Columbus, (O.)*, meets at 12½ North High street, on the first and third Saturdays from September to June.

The *Engineers' Club of Minneapolis* meets in the Public Library Building, Minneapolis, Minn., on the first Thursday in each month.

The *Engineers' Club of Philadelphia* meets at the House of the Club, 1122 Girard street, Philadelphia, on the first and third Saturdays of each month, at 8 p. m., except during July and August.

The *Engineers' Club of St. Louis* meets in the Missouri Historical Society Building, corner Sixteenth street and Lucas place, St. Louis, on the first and third Wednesdays in each month.

The *Engineers' Society of Western New York* holds regular meetings the first Monday in each month, except in the months of July and August, at the Buffalo Library Building.

The *Engineers' Society of Western Pennsylvania* meets at 410 Penn avenue, Pittsburgh, Pa., on the third Tuesday in each month, at 7:30 p. m.

The *Montana Society of Civil Engineers* meets at Helena, Mont., on the third Saturday in each month, at 7:30 p. m.

The *New England Railroad Club* meets at Wesleyan Hall, Bromfield street, Boston, Mass., on the second Tuesday of each month.

The *New York Railroad Club* meets at 12 West Thirty-first street, New York City, on the third Thursday in each month, at 8 p. m.

The *North-West Railway Club* meets on the first Tuesday after the second Monday in each month, at 8 p. m., the place of meeting alternating between the West Hotel, Minneapolis, and the Ryan Hotel, St. Paul.

The *Northwestern Track and Bridge Association* meets at the St. Paul Union Station on the Friday following the second Wednesday of March, June, September and December, at 2:30 p. m.

The *Railway Signalling Club* will meet on the second Tuesday of the months of January, March, May, September and November, in Chicago.

The *St. Louis Railway Club* holds its regular meeting on the second Friday of each month, at 8 p. m.

The *Southern and Southwestern Railway Club* meets at the Kimball House, Atlanta, Ga., on the third Thursday in January, April, August and November.

The *Technical Society of the Pacific Coast* meets at its rooms in the Academy of Sciences Building, 819 Market street, San Francisco, Cal., on the first Friday in each month, at 8 p. m.

The *Western Foundrymen's Association* meets in the Great Northern Hotel, Chicago, on the third Wednesday of each month. A. Sorge, Jr., 1533 Marquette Building, Chicago, is secretary.

The *Western Railway Club* meets in Chicago on the third Tuesday of each month, at 8 p. m.

The *Western Society of Engineers* meets in its rooms on the first Wednesday of each month, at 8 p. m., to hear reports, and for the reading and discussion of papers. The headquarters of the Society are at 1736-1738 Monadnock Block, Chicago.

**Association of Railway Claim Agents.**

This association held its annual meeting at St. Louis May 27 and 28. The officers elected for the ensuing year are: President, E. B. Hutchinson, Indianapolis; Secretary, G. L. Price, Galesburg, Ill.

**Trainmen.**

The International Brotherhood of Railway Trainmen held its annual convention in Toronto last week. P. H. Morrissey, of Peoria, Ill., was elected Grand Master, and A. E. King, of Binghamton, N. Y., Secretary.

**Order of Railway Telegraphers.**

This association held its annual convention at Peoria, Ill., last week. The proposition to join the National Federation of Labor was voted down. The old officers were re-elected: W. V. Powell, Grand Chief, and H. H. Perham, Cripple Creek, Col., Secretary and Treasurer.

**Accounting Officers.**

The Association of American Railway Accounting Officers held its annual meeting at Richmond, Va., May 26 and 27. The following officers were elected for the ensuing year: President, H. M. Kochersperger, New Haven; Secretary and Treasurer, C. G. Phillips, Chicago. Boston was decided upon as the next place of meeting, and May 25, 1898, the time.

**St. Louis Railway Club.**

Arrangements are being made to hold the next meeting of the St. Louis Railway Club on board the new steel-constructed boat belonging to the Wiggins Ferry Co., St. Louis, on the afternoon of Saturday, June 26.

A paper will be presented by Mr. W. S. Glover, Chief Dispatcher C. & O., on "Railroads, the World's Greatest Benefactor to Civilization and Education."

**Western Society of Engineers.**

A regular meeting of the Western Society of Engineers was held in the Society Rooms, Monadnock Block, Chicago, Wednesday evening, June 2. Lient. Odus C. Horney, U. S. Ordinance, presented a paper describing the construction at Rock Island, Ill., by the United States government, of a concrete wing-dam across a portion of the Mississippi River. This dam was built for water power purposes, and the power developed is to be used at the Government Arsenal situated on Rock Island.

**National Electric Light Association.**

The official programme of the twentieth convention of the National Electric Light Association, which will be held at Niagara Falls, N. Y., on June 8, 9 and 10, has just been issued. Arrangements have been made for excursions to various points of interest. The following are among the papers which will be read: "Standardizing Prices for Incandescent Lighting Power," by J. B. Cahoon; "Municipal Lighting," by W. Worth Bean; "Niagara Power Transmission Line," by J. C. White; "Portable Extensions of Electricity Supply Stations," by Arthur Wright; "Recent Progress in Arc Lighting," by Prof. Elihu Thompson; "Daylight Work of Central Station," by T. C. Martin, and "Polyphase Motors," by B. F. Lambe.

## PERSONAL.

—Mr. Henry B. Plant, President of the Plant System, has gone to Japan expecting to remain until October.

—Mr. Johnston Busbee has been appointed Trainmaster of the Southern Railway, with headquarters at Raleigh, N. C.

—Mr. O. H. Poshler has been appointed Commercial

Agent of the Kansas City, Pittsburgh & Gulf, with headquarters at Shreveport, La.

—Mr. J. H. Myers, formerly City Passenger Agent of the Texas & Pacific, at New Orleans, La., has been appointed Soliciting Freight Agent of the same road at New Orleans.

—Mr. Joseph H. Houston has been appointed Commercial Freight Agent of the St. Louis Southwestern, with headquarters at Memphis, Tenn., to succeed Mr. E. P. Reitor, deceased.

—Mr. Charles E. McCrary, formerly Cashier of the Atlantic & Pacific, has been appointed General Auditor of that company and of the Southern California, with headquarters at Los Angeles, Cal.

—Mr. Charles E. Kingston has been appointed Division Freight Agent of the Philadelphia, Wilmington & Baltimore, with headquarters at Philadelphia, to succeed Mr. George Stephens, deceased.

—Mr. H. B. Chesley, Superintendent of the Boston & Worcester Division of the Boston & Albany, with headquarters at Boston, Mass., died at his home in Newtonville, Mass., on May 30, aged 54.

—Mr. Charles W. Dunn has been appointed Inspector of Material and Workmanship of the Brooks Locomotive Works at Dunkirk, N. Y. Mr. Dunn was formerly in the employ of Robert W. Hunt & Co., of Chicago.

—Mr. F. B. Huntington has been appointed Traveling Auditor of the Wisconsin Central, with headquarters at Milwaukee, Wis., to succeed Mr. E. A. Morley, who has resigned to accept a position with the Anaconda Mining Co., of Anaconda, Mont.

—Mr. P. L. Harris has been appointed General Agent, Passenger Department, of the Mobile & Ohio, with headquarters at St. Louis, Mo., to succeed Mr. W. H. Rowland, resigned. Mr. Harris will have jurisdiction over both the St. Louis and Cairo territories.

—Mr. George B. Wheeler has been appointed Division Freight Agent of the Lake Shore & Michigan Southern, with headquarters at Cleveland, O. to succeed Mr. George F. McKay, who has recently been appointed General Manager of the Erie Dispatch at Cleveland.

—Mr. L. M. Fletcher, formerly General Pacific Coast Freight Agent of the Missouri Pacific, with headquarters at San Francisco, will hereafter have charge of both the freight and passenger agencies at that place, with the title of Pacific Coast Freight and Passenger Agent.

—Mr. H. T. Guinn, formerly Cashier of the Missouri Pacific at the South Omaha (Neb.) station, has been appointed General Agent for the company at Nebraska City, Neb., to succeed Mr. H. D. Apgar, recently appointed General Agent of the St. Louis, Iron Mountain & Southern.

—Mr. W. H. Fowler, late of the *Practical Engineer*, of London, has opened an office at Hodson's Court, Corporation street, Manchester, England, as Consulting Engineer. He will give special attention to representing foreign firms in purchasing engineering plants and machinery.

—Mr. E. S. Bowen, formerly General Manager of the South Carolina & Georgia, has been appointed Vice-President of that company, with headquarters in New York City. Mr. Bowen will be succeeded as General Manager by Mr. Joseph H. Sands, now General Manager of the Norfolk & Western.

—Mr. C. L. Hilleary has been appointed City Passenger Agent for the Cleveland, Cincinnati, Chicago & St. Louis, at Columbus, O., to succeed Mr. D. S. Wilder, who has gone to the Baltimore & Ohio. Mr. Hilleary was formerly Traveling Passenger Agent for the company, with headquarters at Cairo, Ill.

—Mr. L. F. Day, Chairman of the Southwestern Traffic Association, with headquarters at St. Louis, has been appointed General Manager of the Minneapolis & St. Louis, with headquarters at Minneapolis, Minn., to succeed Mr. A. L. Mohler, resigned. Mr. Day was born April 4, 1858, in DeWitt County, Ill. He entered railroad service in 1885 and since that time has been successively connected with the Texas & St. Louis, the St. Louis, Arkansas & Texas and its successor, the St. Louis Southwestern, the Louisville, New Orleans & Texas, the Newport News & Mississippi Valley and Ohio Valley railroads. He was appointed Traffic Manager of the Newport News & Mississippi Valley Sept. 1, 1892, but afterward left that position to become Chairman of the Southwestern Traffic Association.

—Mr. Frank H. Soule, General Car Inspector of the New York, New Haven & Hartford Railroad, died of pneumonia at his home in New Haven, Conn., May 28. Mr. Soule began work in the Readville, Mass., shops of the old Boston, Hartford & Erie, afterward controlled by the New England Railroad, and soon after entered the car department of the Fitchburg. Subsequently he became General Inspector of the Fast Freight Line between Boston and Chicago, where he served successfully several years, going to the Lake Shore & Michigan Southern Railroad as General Car Inspector, and from there to the New York, New Haven & Hartford 2½ years ago, in the same capacity. Mr. Soule was an expert car inspector and had a reputation for fairness, which made him well liked. He was a valuable member of the Master Car Builders' Association, and his presence will be missed at the approaching convention. A widow and two daughters survive him.

## ELECTIONS AND APPOINTMENTS.

**Burlington, Cedar Rapids & Northern.**—At the annual meeting of the stockholders held at Chicago May 25 the following Directors were elected for three years: G. W. Cable, Thomas Hedge, J. Car-kadden and C. J. Ives. The present Executive Committee was re-elected as follows: R. K. Cable, J. C. Peasley, J. W. Blythe, W. G. Purdy and C. J. Ives.

**Central Dock & Terminal.**—At the annual meeting of stockholders of this company (a leased line of the Philadelphia & Reading at Buffalo, N. Y.), held in New York City May 27, the following officers were elected: President, H. J. Hayden; Treasurer, W. A. Church; Secretary, W. K. Taylor.

**Chicago & Western Indiana.**—At the annual meeting of stockholders, held at Chicago on June 1, the present officers and Board of Directors were re-elected with the exception of D. B. Robinson, who was succeeded as Director by E. P. Ripley.

**Chicago, Burlington & Quincy.**—The Directors have elected officers as follows: Chairman of Board, John M. Forbes; President, Charles E. Perkins; First Vice-President, James C. Peasley; Second Vice-President, George B. Harris; General Solicitor for lines east, of Missouri



**River, Charles F. Manderson;** Secretary, Thomas S. Howland; Comptroller and Clerk of the Board, Charles I. Sturgis; Assistant Treasurer, Arthur G. Stanwood.

**Detroit & Lima Northern.**—The officers of this road, which is an extension of the Lima Northern, are: President, J. R. Megrue; Superintendent, George R. Haskell; General Traffic and Freight Agent, C. A. Chambers; Passenger Agent, A. J. Richert.

**Fremont, Elkhorn & Missouri Valley.**—At the annual meeting of stockholders, held recently at Omaha, Neb., the following directors were elected for the ensuing year: Marvin Hughitt, Albert Keep, M. L. Sykes, David P. Kimball, M. M. Kirkman, H. G. Burt and J. B. Redfield.

**Lehigh Valley.**—The following appointments have been announced: Robert S. Lewis, formerly Traveling Passenger Agent at Buffalo, N. Y., appointed Canadian Passenger Agent of the Province of Ontario, with headquarters at Toronto; William B. Wheeler, formerly City Passenger and Ticket Agent at Buffalo, appointed Traveling Passenger Agent for Michigan, Ohio and Indiana, with headquarters at Buffalo, to succeed Mr. Lewis; Henry H. Roberts, appointed City Passenger and Ticket Agent at Buffalo, to succeed Mr. Wheeler.

**Manchester & Lawrence.**—At the annual meeting of stockholders of this company, a leased line of the Boston & Maine, officers were elected as follows: President, Charles A. Sinclair; Treasurer, Henry Chandler; Clerk, C. B. Gaffney.

**Mason City & Fort Dodge.**—At the annual meeting of stockholders, held recently at Fort Dodge, Ia., the following officers were elected: President, M. C. Healion; Vice-President, Hamilton Browne; Secretary and Treasurer, S. T. Meservy.

**Mexican Northern.**—At the annual meeting of stockholders, held on May 1, Directors were elected as follows: R. S. Towne, A. R. Meyer, W. F. Dummer, N. Witherell, A. Foster Higgins, E. M. Reynolds and George F. Peabody.

**Mexico, Cuernavaca & Pacific.**—At the annual meeting of stockholders, held in Denver, Col., May 27, the following Board of Directors was elected: J. H. Hampson, W. O. Staples, Luis Mendez, Charles Wheeler, George L. Hodges, Santiago Mendez and F. P. Cochicoa. The officers elected are: J. B. Hampson, President; W. O. Staples, Vice-President and Assistant Secretary; Charles Wheeler, Secretary and Treasurer; J. M. Brash, Assistant Treasurer; George L. Hodges, General Counsel; J. H. Hampson, Geo. L. Hodges and Luis Mendez, Executive Committee.

**Nashua & Lowell.**—At the annual meeting of this road, part of the Boston & Maine system, held at Nashua, N. H., May 26, the present officers were re-elected as follows: President, Francis A. Brooks; Treasurer, William W. Bailey; Clerk, Walter A. Lovering.

**Ohio River.**—At a meeting of the Directors, held in New York City on May 25, the following officers were elected: President, H. H. Rogers; Vice-President and General Manager, George A. Burt; Secretary, A. C. Bedford; Auditor, E. W. Warwick; Treasurer, W. M. Trevor; General Freight and Passenger Agent, John J. Archer; Assistant to General Manager, A. H. Pratt; Executive Committee, H. P. Camden, H. H. Rogers, C. M. Pratt, W. J. Colton, J. N. Camden and A. C. Bedford.

**Pemigewasset.**—At the annual meeting of stockholders of this company, a leased line of the Boston & Maine, held at Concord, N. H., May 24, B. A. Kimball was elected President and George H. Adams, Clerk.

**Pennsylvania.**—At a meeting of the Board of Directors, held May 26, a new division freight agency was created to cover the territory between Johnstown and Harrisburg, Pa. Gilbert H. Cobb was appointed to fill the new office, with headquarters at Altoona, Pa.

**Peterborough.**—At the annual meeting of this road, a part of the Boston & Maine system, held at Nashua, N. H., May 26, officers were elected as follows: President, Virgil C. Gilman; Treasurer, Gilman C. Shattuck; Clerk, W. Ramsdell.

**Philadelphia & Reading.**—At the annual meeting of stockholders held at Philadelphia on June 1, the following Directors were elected: Joseph S. Harris, George F. Baer, Charles H. Coster, Francis Lynde Stetson, John Lowber Welsh, Thomas McKean, George C. Thomas, A. J. Antelo and Henry A. Du Pont. After the election the board organized by electing the following officers: Joseph S. Harris, President; W. R. Taylor, Vice-President; W. A. Church, Treasurer, and W. G. Brown, Secretary.

**Ravenswood, Spencer & Glenville.**—At a meeting of the recently elected Directors, held at Parkersburg, W. Va., on May 28, the following officers were elected: President and General Manager, George A. Burt; Vice-President, H. P. Camden; Treasurer, W. M. Trevor; Auditor, E. W. Warwick.

**Suncook Valley.**—At the annual meeting of stockholders of this company, a leased line of the Boston & Maine, held at Manchester, N. H., on May 27, Hiram A. Tuttle was re-elected President and W. M. Parker, Treasurer.

**Washington, Westminster & Gettysburg.**—At a recent meeting of the stockholders of this proposed railroad in Maryland held at Washington, D. C., the following officers and Directors were elected: President, Stilson Hutchins; Vice-President, J. B. Colgrove; Secretary, H. A. Cady; Treasurer, William B. Thomas. Directors: Stilson Hutchins and J. B. Colgrove, Washington, D. C.; George C. Smith, Wilkes-Barre, Pa.; William B. Thomas and E. J. Lawyer, Westminster, Md., and T. Herbert Shriver, Union Mills, Md.

**Whitefield & Jefferson.**—At the annual meeting of stockholders of this company, a leased line of the Boston & Maine, held at Concord, N. H., on May 24, Nathan R. Perkins was elected President and John F. Webster, Clerk.

**Willton.**—At the annual meeting of this road, part of the Boston & Maine system, held at Nashua, N. H., on May 26, the following officers were re-elected for the ensuing year: President, Solomon Spalding; Treasurer, William E. Spalding; Clerk, David Whiting.

#### RAILROAD CONSTRUCTION, Incorporations, Surveys, Etc.

**Baltimore & Ohio.**—A number of improvements are now being made on the Pittsburgh Division. About 15 miles of second track are being laid, and at Kelly's Cut, near Cumberland, Md., several changes are being made, including a 530-ft. trestle, three bridges and a mile of new

track. Several curves will be eliminated and a treacherous mountain side avoided. The change will cost about \$100,000 and is expected to be completed late in the fall.

**Carrollton Short Line.**—This company has recently been organized in Alabama to build a railroad 10 miles long from Carrollton to a connection with the Montgomery, Tuscaloosa & Memphis, the extension of the Mobile & Ohio now being built between Montgomery and Columbus. The capital stock is \$30,000 and among the incorporators are E. R. Calhoun, W. G. Robertson and S. H. Hill.

**Chesapeake & Ohio.**—A force of 300 men is now at work building a second track and rebuilding the roadbed between Huntington and Kenova, W. Va., 7 miles. A steel bridge is to be built over Four Pale Creek at the west end of Central City to take the place of the trestle which is now in use. A sharp curve just beyond this bridge is to be eliminated, necessitating a fill about 300 ft. long with a maximum height of 40 ft.

**Chicago, Fort Wayne & Eastern.**—The preliminary surveys have been completed for this road, which is proposed to extend from Fort Wayne, Ind., west to Kankakee, Ill., about 150 miles. It is reported that the line surveyed between these two points is direct with few exceptions. It will pass through Akron, Ind., and will cross the tracks of the Chicago & Eastern Illinois near Wicher, Ill. It is proposed to connect with the Findlay, Fort Wayne & Western at Fort Wayne, and with the Illinois Central at Kankakee.

**Chicago Heights & Northern.**—This company was recently incorporated in Illinois, to build a road from Chicago Heights, north about 12 miles to South Chicago. The new line will form a branch of the Elgin, Joliet & Eastern, which now enters South Chicago from Dyer, Ind. The capital stock of the new company is \$10,000. The incorporators are: A. F. Banks, Norman Williams, Jr., Frank E. Learned, L. O. Stanton and William P. Hanson.

**Coast Railway of Nova Scotia.**—Track has been laid on this road from Yarmouth, N. S., to a point between Central Argyle and Lower Argyle stations, about 23 miles, and grading is now being pushed beyond Lower Argyle toward Pubnico. It is expected to complete the road to Pubnico, about 12 miles beyond Lower Argyle, by July 1. Stations at Yarmouth and Central Argyle have been finished, and those at Lower Argyle and Pubnico are well under way. The road is proposed from Yarmouth around the southern end of the peninsula, to Lockport, and it is proposed to complete it to the latter place during 1898. An extension to Halifax, about 100 miles further, is contemplated. The road is being built by the Nova Scotia Development Co.

**Great Northern.**—A report from Langdon, N. Dak., states that preliminary surveys have been made for an extension of the Larimore & Langdon Branch, northwest about 22 miles from Langdon, reaching a point within two miles of the Canadian line. The line passes along the northeast bank of Rush Lake and is expected to furnish transportation for an extensive agricultural district from which the products have now to be shipped by wagon. It is expected that construction work will be begun this season.

**Kickapoo Valley & Northern.**—It is reported from Milwaukee, Wis., that a contract has been let to McIntosh Bros., of that city, for an extension of this road from its present northern terminus at Readstown, Vernon County, Wis., northeast 16 miles to La Farge, Vernon County. The most difficult portion of the work will be a tunnel about 600 ft. long, near Viola. The road now extends from Wauzeka, Crawford County, Wis., north 33.5 miles to Readstown, connecting at Wauzeka with the Chicago, Milwaukee & St. Paul.

**Little Kanawha Valley.**—A contract for building the first 30 miles of this road has been let to Joseph Fucy, of Weston, W. Va., who represents a contracting company. It is expected that grading will be begun at once, tools and teams being now in storage at Weston. It will be necessary to build three tunnels on this section of the road, and work is to be begun on all of these simultaneously. The proposed road is to extend from the Ohio River Railroad at Parkerburgh, W. Va., through Wood, Calhoun, Gilmer and Braxton counties to a connection with the West Virginia & Pittsburgh. Location surveys of the first 30 miles have been made, and right of way has been secured. Thomas Pettigrew is Chief Engineer.

**Mexico, Cuernavaca & Pacific.**—An arrangement has been made with certain local banks of the City of Mexico for the necessary funds to complete this road to the Mescala River in the State of Guerrero, about 300 km. (186 miles) south of the City of Mexico. On the Mexico Division of the road 95 km. (59 miles) are now in operation, 20 km. having been completed south of Tres Marias during the past year. Grading is being pushed toward Cuernavaca, and it is expected that the road will be completed to that city by Sept. 1. A total of 40 km. (25 miles) are now in operation on the Southern, or Iguala, Division. Location surveys for the line joining these two divisions have been made, and the plans approved by the Federal Government. It is expected that the gap will be closed by the end of the present year, giving a line from Mexico City to Iguala of about 235 km. (145 miles), passing through agricultural districts. The line runs west from the City of Mexico, crossing the main range of mountains at an altitude of 9,892 ft., at a distance of 61 km. Thence it descends into the Cuernavaca Valley to an altitude of about 4,000 ft. The total rise is 2,500 ft., and the fall on the western slope 5,000 ft. The maximum grades are 3 per cent., and the maximum curve 60 deg. The objective point of the road is Acapulco, on the Pacific Coast, which point must be reached by June 30, 1902, under the latest concessions given to the company by the Federal government.

**Missouri River & Los Angeles.**—This company has recently been organized in Nebraska with a capital stock of \$425,000,000. It is proposed to build a road from some point on the Missouri River, probably at Sioux City, Ia., west to Los Angeles, Cal. Between Dakota City, Neb., and O'Neill, Neb., the line will be distinct from the Pacific Short Line, but from O'Neill west it is proposed to use the right of way which has recently been secured by Mr. Donald McLean. The company proposes to build a bridge over the Missouri Pacific between Sioux City and Dakota City. The incorporators of the company are A. V. Larimer, Dakota City; Francis McNulty, Donald McLean and Robert Buchanan, Sioux City; Henry Woods, Dakota City, and E. B. Reynolds, Jr., Wymore, Neb.

**Philadelphia, Wilmington & Baltimore.**—The new line being built by the company between Elkton and Iron Hill, Md., four miles, has been graded ready for rails, and it is expected that track-laying will be begun at once. The line is being built to avoid a sharp curve,

**Queen Anne's.**—Grading has been completed as far east as Milton, Del., seven miles beyond Ellendale, and rails have been laid to the latter place. The eastern terminus of the road will be at Lewes, on the Atlantic Coast, and it is expected that the road will be completed to that place by Aug. 1.

**Red Star Line.**—This company has been incorporated in West Virginia by J. M. Richards, William Richards, C. J. Bibb, Thomas E. Richards and W. H. Richards, all of Oak Hill, W. Va. It is proposed to build a road from Red Star, W. Va., a point on the Chesapeake & Ohio, along the valley of Smith's Branch, to the mouth of White Oak Creek, thence up the valley of that creek to the head waters of Wolf Creek, thence along Wolf Creek to Fayette station, thence to a point on the Greenbrier & New River Railroad in Fayette County. The charter also provides for branch lines to enter coal and timber lands along Arbuckle and Meadow creeks.

**Roaring Creek and Charleston.**—This company is making extensive improvements on its line through the Roaring Creek Valley in Upper West Virginia. A siding about 1,500 ft. long, and a 60-ft. bridge over Roaring Creek are being built at Maibee, and a 3-mile branch is being built up "Jim Wood" Valley to a timber and coal district. The road is 38 miles long, and follows the Roaring Creek Valley, mostly through timber lands.

**St. Louis, Peoria & Northern.**—The contract for the earthwork on the extension of this road from Springfield north to Peoria has been given to James A. Ware, of St. Louis, Mo.; the contract for timber work has been given to Burnett & Lutes, of St. Louis, Mo. The masonry and steel bridges have not yet been awarded, but it is expected that bids will be called for within a few days. It is expected that the extension will be completed and that train service will be begun by Nov. 1 next. The road now extends from St. Louis northwest to Springfield, Ill., 100 miles. William E. Guy, St. Louis, Mo., is President.

**Terminal Railway of Buffalo.**—It has been announced that work on this road, which is proposed to connect the Lake Shore & Michigan Southern at Blasdell, N. Y., with the New York Central & Hudson River at Dapaw, will be begun immediately. The road will be eight miles long and the construction work light, there being few large cuts and fills to be made and no large bridges to be built. The company was incorporated in June, 1895, but it was only a few months ago that right of way for the entire line was obtained. With this road, switching through the yards at Buffalo will be avoided, and the yards at Westfield, N. Y., will probably be abolished. It is expected that the road will be completed within two months.

**Texas Midland.**—Surveys are now being made for a branch from Quinlan, Tex., a point 15 miles north of Terrell, southwest 35 miles to Dallas. It is reported that this branch, if built, will be ultimately extended from Dallas west to Fort Worth. It is also reported that the company proposes an extension from Ennis to the present southern terminus of the road, southwest to Waco.

**Tylerdale Belt Line.**—This company was incorporated in Pennsylvania on May 31 with a capital stock of \$15,000. It is proposed to build a road from a point on the Pittsburgh, Cincinnati, Chicago & St. Louis, near the Tyler Tube Works, in Canton Township, Washington County, Pa., to a point in the same township at or near what is known as the McGovern Farm, on the line of the Baltimore & Ohio, with which road connection will be had. The length of the road will be about 1½ miles. S. Hazlett, of Washington, Pa., has been elected President of the company. The Directors are George L. Hayes, Samuel Workman, E. E. Bothenfield, Albert S. Sprowl and J. M. Ralston, all of Washington, Pa.

**Washington, Westminster & Gettysburg.**—A preliminary survey for this proposed railroad in Maryland has been made from Cabin John, a point on the Potomac River, in Montgomery County, a few miles above Washington, D. C., in a general northerly direction to Gettysburg, Pa., passing through Rockville, Washington Grove, Laytonsville, Eltham, Damascus, Mt. Airy, Westminster and Union Mills, Md., and through Littleton, Pa., a distance of about 75 miles. The names of the officers are given in another column.

**West Virginia Northern.**—Final surveys are now being made for the extension of this road, formerly the Tunnelton, Kingwood & Fairchance, from Kingwood northwest to Morgantown, W. Va., 22 miles. It is expected that these surveys will be completed by July 1, and the work of building begun soon after. Vice-President and General Manager Martin made arrangements some time ago for raising money for this proposed extension. A part of the distance between Morgantown and Kingwood was graded 15 years ago. The road now extends from Tunnelton north 10 miles to Kingwood.

#### Electric Railroad Construction.

**Anderson, Ind.**—A dispatch from Elwood, Ind., states that Louis Enright, of Chicago, has contracted to build the 31 miles of the Clodfelter electric railroad from Marion to Anderson within 60 days, and has a force of 800 men at work on the line. In the 31 miles are 22 bridges to build, 13 railroads to cross, 200,000 yards of roadbed to grade and 300,000 lbs. of wire to string.

**Baxter Springs, Kan.**—C. W. Daniels, Secretary of the Southeast Kansas Railway Co., of Baxter Springs, Kan., writes us that the proposed Southeast Kansas Railroad will run from Baxter Springs, Kan., through Lowell, Galena and various mining camps to Empire, Kan. It is to be an electric road for both freight and passenger service. A preliminary survey has been made, and work will probably be commenced within 60 days. J. M. Cooper, Baxter Springs, is President.

**Beaver, Pa.**—The new extension of the lines of the Beaver Valley Traction Co. from Beaver to Vanport has been opened for traffic.

**Belle Vernon, Pa.**—The Belle Vernon & East Side Railway Co. was granted a charter May 26. The capital stock is \$30,000. Among the incorporators are H. R. Meyer, George D. Jenkins and O. M. Hartley.

**Chippewa Falls, Wis.**—The Chippewa Valley Electric Railroad Co. has been incorporated with a capital stock of \$100,000 by A. J. Kiehl, W. C. Donovan and others to build an electric road in Chippewa Falls.

**Cleveland, O.**—Mr. C. W. Wason, President of the Cleveland, Painesville & Eastern Railroad Co., informs us that the Lake Commissioners have granted a franchise to extend the road westward to the Lake road and thence westerly to the county line. It is the purpose of the company to reach Cleveland from Painesville over the Lake road by Sept. 1.



**Detroit, Mich.**—A. B. du Pont, Manager of the Detroit Citizens' Street Railway Co., writes us that some improvements will be made on the lines of that company, but that no material change in the track construction will be made, nor is it proposed to cast-weld the joints, as has been reported.

**Exeter, N. H.**—The Exeter Street Railway Co. has awarded the contract for building its power station to John Giddings & Sons, Somerville, Mass.

**Fort Erie, Ont.**—The Fort Erie & St. Bridgeburg Railway Co. has been incorporated with a capital stock of \$50,000 to build a short electric road in Fort Erie. W. M. German and E. W. Oviatt, of Buffalo, N. Y., are said to be interested in the project.

**Meadville, Pa.**—The Meadville Traction Co., capital \$350,000, was chartered at Harrisburg, May 31, to build lines in Meadville and Cambridge Springs, in Crawford County, and Edinboro, in Erie County. The incorporators include F. R. Shryock, Charles Fahr and George D. Trowen.

**Milford, Mass.**—The Milford, Hopkinton & Westboro Street Railway Co. has been incorporated with a capital stock of \$120,000 by C. W. Scippee, J. A. Rice, L. E. Coolidge and others.

**Newport, R. I.**—The work of laying the new rails for the Newport Street Railway Co. has been partially completed, so that with the improvements to be made on Franklin street the road will be able to give much better service.

**Penn Yan, N. Y.**—The engine and generator-room of the Penn Yan, Keuka Park & Branchport Railway Co. will be 35 x 60 ft., and the boiler-room 30 x 60 ft. Two 200-H. P. Dillon boilers and two 17 x 36-in. Slater engines with a Deane condenser will be installed. Plans for the plant have been made by Richard P. Jenks, Providence, R. I. The total length of the road will be eight miles.

**Portsmouth, Me.**—Judge Weswell has rendered a decision in which he denies all the petitions for injunctions against the construction of the Portsmouth, Kittering & York Railroad Co. The work of laying the tracks through the disputed section of York Harbor was begun this week, and it is expected that the road will be ready to carry passengers by July 1.

**St. Louis, Mo.**—A company with a nominal capital of \$2,000 has asked for a franchise for an electric road through many of the principal streets of St. Louis, the road to be known as the North & South Railroad Co.

**San Francisco, Cal.**—The San Francisco & San Mateo Electric Railway Co., which was organized after the foreclosure of the San Francisco and San Mateo Railway Co. in April, 1896, has decided to rebuild 10 miles of track this summer, using 85-lb. 8-in. girder rails. This is all the work which will be done at present, but later some extensions may be made. The capital stock of the company is \$1,000,000, the directors owning all the stock.

**Tamaqua, Pa.**—The Tamaqua & Langford Street Railway Co. began the construction of its electric road on May 27. It is expected that the road between Tamaqua and Summit Hill, connecting the towns in the Panther Creek Valley, will be ready for service by Aug. 15.

**Tonawanda, N. Y.**—Reports state that the Tonawanda Electric Railroad Co. has applied for permission to build an electric road through the streets of Niagara Falls, starting at Tonawanda. J. H. Rand, Tonawanda, is President.

**Wellesley, Mass.**—The Wellesley & Boston Street Railroad Co. has decided to extend its line, and has asked the Railroad Commissioners for permission to increase the capital stock of the company from \$40,000 to \$100,000.

#### GENERAL RAILROAD NEWS.

**Atchison, Topeka & Santa Fe.**—The earnings for April and for the 10 months ended April 30 were as follows:

April:	1897.	1896.	Inc. or Dec.
Gross earn.....	\$2,510,499	\$2,203,271	I. \$307,228
Oper. expen.....	2,076,351	1,644,949	I. 431,402
Net earn.....	\$434,148	\$558,322	D. \$124,174
Taxes and rent.....	145,742	162,387	D. 16,645
Inc. from oper.....	\$288,506	\$395,935	D. \$107,429
Ten months:			
Gross earn.....	\$25,671,177	\$24,590,912	I. \$1,080,265
Oper. expen.....	18,780,732	18,562,101	I. 218,631
Net earn.....	\$6,890,445	\$6,028,811	I. \$861,634
Taxes and rent.....	1,571,334	1,616,181	D. 44,847
Inc. from oper.....	\$5,319,111	\$4,412,630	I. \$906,481

**Baltimore & Ohio.**—Notice has been given by the receivers that they will pay interest upon the following securities on June 1: Schuykill River East Side Railroad first mortgage bonds; receivers' certificates issued June 1, 1896, \$5,000,000; receivers' certificates issued Dec. 1, 1896, \$956,000. They will not at that time pay the interest on the terminal mortgage bonds, 2½ per cent. on \$8,500,000, nor will they at the same time pay the interest on the Chicago Division sterling loan of 1877. These properties will have been in the hands of the receivers for 15 months to June 1, during which time two interest installments have been paid.

The receivers will apply to the United States Court at Baltimore, Md., this week for authority to issue \$680,000 additional receivers' five per cent. certificates for the purpose of paying for 40,000 tons of rails recently purchased by the receivers from the Carnegie Steel Co. It is understood that these certificates will form a prior lien to the \$5,000,000 six per cent. receivers' certificates issued June 1, 1896.

**Baltimore & Ohio Southwestern.**—In a suit brought by the Farmers' Loan & Trust Co., of New York, against this company, before Judge Davis, of the Common Pleas Court, at Cincinnati, O., a decree was given May 28 providing for a refunding of the Ohio & Mississippi 7 per cent. first consolidated bonds, which will mature Jan. 1, 1898. A new issue of 4 per cent. 50-year bonds dated Jan. 1, 1897, will be made to take up the \$6,385,000 of 7 per cent. bonds now outstanding. The new bonds will bear the guarantee of the Baltimore & Ohio Railroad.

**Central of New Jersey.**—The earnings for April and for the four months ended April 30 have been reported as follows:

April:	1897.	1896.	Inc. or Dec.
Gross earn.....	\$346,769	\$347,807	D. \$1,038
Oper. expen.....	603,439	639,701	D. 36,262
Net earn.....	\$333,330	\$308,106	I. \$25,224
Four months:			
Gross earn.....	\$3,524,138	\$3,712,973	D. \$188,835
Oper. expen.....	2,430,219	2,563,039	D. 132,820
Net earn.....	\$1,093,919	\$1,149,934	D. \$56,015

**Chicago, Burlington & Quincy.**—The earnings for April and for the four months ended April 30 have been reported as follows:

April:	1897.	1896.	Inc. or Dec.
Gross earn.....	\$2,611,824	\$2,511,750	I. \$100,074
Oper. expen.....	1,778,568	1,732,585	I. 45,983
Net earn.....	\$836,956	\$779,174	I. \$57,782
Fixed charges.....	890,000	881,107	I. 8,893
Surplus.....	\$6,936 (Def.)	\$101,933	I. \$108,869
Four months:			
Gross earn.....	\$11,113,653	\$10,415,921	I. \$697,732
Oper. expen.....	6,624,981	6,855,216	D. 230,235
Net earn.....	\$4,488,672	\$3,560,705	I. \$927,967
Fixed charges.....	3,560,000	3,524,428	I. 35,572
Surplus.....	\$928,672	\$36,277	I. \$892,395

**Chicago, Milwaukee & St. Paul.**—The earnings for April and for the 10 months ended April 30 have been reported as follows:

April:	1897.	1896.	Inc. or Dec.
Gross earn.....	\$2,203,769	\$2,366,590	D. \$162,820
Oper. expen.....	1,463,322	1,590,393	D. 127,070
Net earn.....	\$740,447	\$776,197	D. \$35,750
Ten months:			
Gross earn.....	\$25,408,568	\$27,818,970	D. \$2,410,401
Oper. expen.....	15,352,749	16,497,965	D. 1,145,215
Net earn.....	\$10,055,819	\$11,321,005	D. \$1,265,186

**Cleveland, Cincinnati, Chicago & St. Louis.**—The earnings for April and for the 10 months ended April 30, have been reported as follows:

April:	1897.	1896.	Inc. or Dec.
Gross earn.....	\$1,063,973	\$1,036,118	I. \$27,855
Oper. expen.....	825,572	794,503	I. 31,070
Net earn.....	\$238,406	\$241,606	I. \$3,200
Int. and rent.....	237,765	230,740	I. 7,025
Surplus.....	\$5,641	\$10,866	D. \$5,225
Ten months:			
Gross earn.....	\$10,932,200	\$11,481,974	D. \$549,774
Oper. expen.....	8,162,595	8,560,959	D. 398,364
Net earn.....	\$2,769,605	\$2,921,015	D. \$151,410
Int. and rent.....	2,388,328	2,363,044	I. 25,284
Surplus.....	\$381,277	\$567,991	D. \$186,714

**Erie.**—The earnings for April were as follows:

April:	1897.	1896.	Inc. or Dec.
Gross earn.....	\$2,446,795	\$2,418,567	D. \$28,228
Oper. expen.....	1,938,782	1,832,225	D. 106,557
Net earn.....	\$508,513	\$586,342	D. \$77,829

**Galveston, La Porte & Houston.**—It is reported from Houston, Tex., that the offer to buy this road, made some time ago by C. P. Huntington, was accepted at a recent meeting of a committee of creditors. Mr. Huntington's offer was \$1,000,000 in 4 per cent. gold bonds. The road extends from Houston to Galveston, Tex., 56 miles, with a branch from Dickinson Junction to North Galveston, 4 miles, and another branch from La Porte, Tex., to East La Porte, 2 miles. The road went into the hands of Receivers on Jan. 7, 1895.

**Kansas Central.**—In pursuance of a decree of foreclosure given by the Circuit Court of the United States in Kansas, this road was to have been sold at Leavenworth, Kan., on May 25. The sale has been postponed until June 15 at the request of the Eastern bondholders. The road extends from Leavenworth to Miltonvale, Kan., 165 miles, and went into the hands of receivers on Oct. 13, 1893.

**Louisville & Nashville.**—The earnings for April and for the 10 months ended April 30 have been reported as follows:

April:	1897.	1896.	Inc. or Dec.
Gross earn.....	\$1,539,408	\$1,534,191	I. \$5,217
Oper. expen.....	1,114,582	1,137,219	I. 22,637
Net earn.....	\$424,826	\$396,972	I. \$27,854
Ten months:			
Gross earn.....	\$17,627,621	\$17,140,310	D. \$487,311
Oper. expen.....	11,532,767	11,700,240	D. 167,473
Net earn.....	\$6,094,854	\$5,440,070	D. \$654,784

**Mexican Central.**—The earnings for April and for the four months ended April 30 have been reported as follows:

April:	1897.	1896.	Inc. or Dec.
Gross earn.....	\$1,170,179	\$834,038	I. \$336,141
Oper. expen.....	747,469	560,789	I. 186,680
Net earn.....	\$422,710	\$273,249	I. \$149,461
Four months:			
Gross earn.....	\$4,396,568	\$3,302,997	I. \$1,093,571
Oper. expen.....	2,862,435	2,163,035	I. 699,400
Net earn.....	\$1,534,133	\$1,139,962	I. \$394,171

**New York Central & Hudson River.**—A special meeting of the stockholders, at which 710,692 shares were represented, was held at Albany, N. Y., on May 26, and the proposition for refunding the bonded debt of the company was authorized. An account of this refunding plan was given in our issue of April 23, page 292; it is proposed to issue \$100,000,000 first mortgage bonds bearing 3½ per cent., by which the present bond of the company, aggregating \$82,677,000 will be retired. It is expected that the saving in interest will be about \$1,500,000.

**Peoria, Decatur & Evansville.**—A committee consisting of Moses L. Scudder, Chairman; Charles S. Fairchild, Jenkins Vanschaick, R. S. Grant and William H. Payne, representing the second mortgage bondholders, has prepared a plan of reorganization. Holders of the first mortgage bonds are invited to deposit their holdings and to receive an advance of \$25 in cash for each past due coupon and thereafter \$25 for each maturing coupon, this in effect being a reduction of interest from six to five per cent. until the new bonds to be issued begin to draw interest. It is proposed to issue \$3,000,000 new first mortgage 40-year bonds, which will cover the entire line, besides a temporary mortgage, second lien, \$500,000; preferred stock, five per cent., non cumulative, \$2,550,000; and common stock, \$3,500,000. The road is 238 miles long, and runs from Evansville, Ind., to Pekin, Ill. The first mortgage bonds are now divided, \$1,287,000 on the Peoria Division from Pekin to Decatur, Ill., and \$1,470,000 on the Evansville Division from Harvey City, Ill., to Evansville.

**Short Route Railway Transfer.**—In pursuance of a decree of foreclosure entered in the United States District Court at Louisville, Ky., this road was sold at Louisville on May 31 to the Illinois Central Railroad for \$500,000. The property consists of a double track elevated road 1½ miles long at Louisville, extending in

Fulton and Water streets from Preston to Fourteenth streets, and is the only means of entrance to the Union station. The road was opened for traffic May 14, 1884, and went into the hands of receivers Jan. 1, 1894. Trackage rights over the lines are held by the Southern, Illinois Central, Louisville, Henderson & St. Louis, Cleveland, Cincinnati, Chicago & St. Louis, Baltimore & Ohio Southwestern and Chesapeake & Ohio.

**Southern Pacific.**—The earnings of the entire system for April and for the ten months ended April 30 have been reported as follows:

April:	1897.	1896.	Inc. or Dec.
Gross earn.....	\$3,845,674	\$3,720,949	I. \$124,725
Oper. expen.....	2,615,738	2,739,084	D. 123,346
Net earn.....	\$1,199,936	\$980,965	I. \$218,971
Ten months:			
Gross earn.....	\$41,295,318	\$42,480,076	D. \$1,184,758
Oper. expen.....	26,409,892	27,517,298	D. 1,107,406
Net earn.....	\$14,885,426	\$14,962,778	D. \$77,352

**Wabash.**—A decision against this company and the Eel River Railroad was given in the Superior Court at Kokomo, Ind., on May 28, in the suit brought by the state of Indiana to annul the lease of the Eel River Railroad to this company. It is held that the Eel River had no right under its charter to lease itself to a competing line. It is expected that a receiver will be appointed for the Eel River and that the road will be sold. The lease was made Oct. 6, 1888, at a rental of \$60,000 per annum until April 1, 1892, \$75,000 per annum until April 1, 1893, and \$90,000 per annum thereafter. The Eel River Railroad extends from Logansport, Ind., to Butler, Ind., 94 miles, and forms the Logansport & Detroit Division of the Wabash.

**Wilmington, Newbern & Norfolk.**—A decree for the sale of this road was issued by Judge Simonton in the United States Circuit Court at Charleston, S. C., on May 27. The date of the sale has not been fixed, but it is understood that it will be about Aug. 1. The sale will be made by H. A. Whiting, of Wilmington, N. C. Mr. Whiting was appointed Receiver of this road on March 15, 1896, by Judge Simonton on the application of John D. Bellamy, of Wilmington, Attorney for the State Trust Co., of New York, trustee of the mortgage bondholders. The road extends from Wilmington to Newbern, N. C., 87 miles.

#### Electric Railroad News.

**Brooklyn, N. Y.**—The gross earnings of the roads operated by the Brooklyn Rapid Transit Co. for the month of May are as follows:

Month of May:	1897.	1896.
Brooklyn Heights.....	\$147,442	\$428,436
Brooklyn, Queens County & Suburban.....	63,814	69,485
Total.....	\$186,256	\$497,921
Eleven months ending May 31:		
Brooklyn Heights.....	\$1,149,912	\$1,027,418
Brooklyn, Queens County & Suburban.....	671,456	637,941
Total.....	\$1,821,368	\$1,665,359

**Gettysburg, Pa.**—The President of the Gettysburg Electric Railway Co. informs us that the property is to be sold under foreclosure proceedings on June 10 next and that the future developments of the property will depend upon the result of that sale. E. M. Hoffer, 2020 Chestnut street, Philadelphia, may be addressed for information.

**New York.**—At a meeting of the Dry Dock, East Broadway & Battery Railroad Co. the usual quarterly dividend was not declared. Mr. G. E. Kissel was elected President in place of R. Kelly, who recently died.

**New Haven, Conn.**—The Winchester Avenue Railroad Co. has been authorized to increase its capital stock to an amount not exceeding \$1,000,000.

**Owego, N. Y.**—Mr. F. R. Tidman, Receiver of the Lake Ontario & Riverdale Railway Co., has applied for permission to borrow \$50,000 on receiver's certificates for the purpose of paying the wages due to the employees, and to purchase new motors and other apparatus necessary to place the road on a paying basis.

#### TRAFFIC.

##### Traffic Notes.

The reorganization of the Southwestern Traffic Association was practically perfected at a meeting held in New York City May 26. The organization is now called the Southwestern Traffic Bureau.

Press dispatches report that the passenger rate war between Portland, Or., and San Francisco has again broken out, first class rates, including berths, having fallen to \$15 by rail and \$8 (cabin) by steamer.

The General Baggage Agent of the Northern Pacific announces that hereafter dogs will be carried in baggage cars free of charge. To each dog a tag will be attached, on which is printed a release, which the owner must sign.

E. P. Wilson, of Cincinnati; N. B. Kelly, of Philadelphia, and James S. Davant, of Memphis, have issued a call for a meeting of commercial bodies to be held in Cincinnati June 8 to consider the question of legalizing pooling of railroad earnings.

The Atchison, Topeka & Santa Fe has taken off its semi-weekly fast train between Chicago and the Pacific Coast, but has quickened the time of the daily train, making the schedule to San Francisco 15 hours shorter and to Los Angeles five hours shorter than heretofore. The Chicago & Northwestern has added 15 daily trains in each direction between Chicago and Evanston, increasing the number from 36 to 51. It is said that this is to meet the competition of electric lines.

##### The Sebastian Ticket.

For the sale of summer tourist tickets to Colorado common points this season, the Sebastian ticket is to be used. This ticket, the invention of General Passenger Agent John Sebastian of the Rock Island road, guards well against manipulation. The Colorado tourist tickets are only sold for the round trip, and the return portion of the ticket, duly signed by purchaser, is detached by selling agent, and forwarded to a joint agent in Denver. The passenger receives the going portion, and an order for the return ticket. As the form of exchange order used and the going ticket are of a blind nature, any one trying to wrongfully use the ticket would have difficulty in giving the required description.